iger Zip: 1't Panic, Just Plan

By Don Leavitt CW Staff

While the U.S. Postal Service has yet to define most of the details surrounding the where, why and how to use the nine-digit Zip Code [CW, Oct. 2], certain basic facts are known and a certain level of planning can be undertaken.

Anything beyond long-range planning, however, is probably premature since the Postal Service is deliberately taking a slow approach

to the whole question of implementation. Complete details aren't expected for at least a year and possibly not until the summer of 1980.

But a Postal spokesman has said that use of the extended Zip Code will be voluntary and that monetary incentives will probably be available to encourage it, much as such incentives are in place now to encourage presorting on the existing five-digit Zip

The four-digit add-on — "we won't be doing anything to the current five-digit code" — will be all-

numeric. Alphanumeric codes, such as those now used in Canada and the UK, were considered at one time, but they were ruled out, the spokesman said.

Presorting by mailers will "certainly be encouraged" and will involve sequencing on all nine digits; sorting on the existing five digits will be helpful to the Postal Service, but won't get the mailer any (Continued on Page 8)

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**Analysis** 

HE NEWSWEEKLY FOR THE COMPUTER COMMUNIT

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# IBM 370-Compatible Units **Emulate Two CPUs at Once**

By Howard A. Karten CW Staff

CHICAGO - Users of mid-scale IBM 370s and other systems in that performance range will receive yet another option this week when Nanodata Corp. of Buffalo, N.Y., announces its entry into the 370-compatible market.

The VMX 200 and VMX 400, which will be introduced here at the Fifth International Information Management Exposition & Conference (Info '78), possess performance characteristics that exceed the IBM 370/138 and 370/-148, respectively, a spokesman claimed.

The systems rely on multibus, multiprocessor architecture to emulate a wide variety of mainframes, of which the 370s are only some. A

main store bus, two I/O buses and two additional buses, as well as three types of processors, are said to provide the flexibility that acts as a bulwark against obsolescence caused by technological innovation.

The three types of processors are execution processors, supervisory processors and auxiliary processors. The supervisory processor is responsible for controlling and providing diagnostic functions for the entire machine, monitoring system resources and in-

itiating automatic recovery in the event of failure of any part of the system.

In addition, it is said to allow remote diagnosis and updating of system microcode.

Info '78 opens today in Chicago. A special preview of the four-day Information Management Exposition & Conference follows Page 68.

A maximum of 13 auxiliary processors can be attached to the VMX 400, while the VMX 200 will accommodate up to four. These processors supply such services as system support, I/O (Continued on Page 6)



# And the Winner Is . . .

Women runners speed across the finish line of the Bonne Bell Mini Marathon course in Boston last week as a minicomputer races to keep up with them. See story on Page 5.

# Enhances Cobol, Infos

# G Adds High-, Low-End Eclipses

By Jeffry Beeler

CW Staff

NEWTON, Mass. - Data General Corp. last week expanded the Eclipse family's range of distributed processing applications when the company

broadened the minicomputer line by adding two systems - one at the high end and another at the low end.

DG intends the entry-level system designated the Eclipse C/150 - primarily for small, dedicated applications at the regional offices of Fortune 500 firms and other large users, according to a spokesman for the minicomputer manufacturer.

The high-end addition, meanwhile, will primarily perform large, multifunction applications as the host mainframe for major corporate divisions, the source explained.

With the two additional systems, the Eclipse line for the first time has penetrated the low end of the distributed processing applications spectrum and at the same time inched upward in that

The dual introductions also broaden the Eclipse family's price range from \$100,000 to \$400,000 before to \$55,000 to \$500,000 now, the spokesman said.

DG described the top-of-the-line offering, which lacks a separate model number, as an enhanced M/600 with a

maximum main storage capacity of 2M bytes. Previous M/600 versions accommodated only up to 1M byte.

# Software Enhancements

As part of the same product announcement, DG also introduced enhancements to two of the Eclipse family's software products - Cobol and Infos file management package.

(Continued on Page 4)

The software products industry has a great future - but just what is that industry? Martin A. Goetz offers his definition and predictions in this week's In Depth, which follows Page 68.

# User Gets \$270,000 Award In GA Contract Dispute

By Tim Scannell CW Staff

CEDAR RAPIDS. Iowa - The Federal District Court here has found General Automation, Inc. guilty of breach of contract in a dispute over an inoperative computer system and has red the firm to pay \$270,000 in ac tual damages to William C. Brown Publishing Co. of Dubuque.

The court, after a one-day hearing, ruled in favor of the user in a suit that charged GA with fraud and reckless disregard of customer interests. However, the dollar award came nowhere near the original \$750,000 in actual

damages and \$10 million in punitive damages sought from the Anaheim, Calif.-based computer firm.

The litigation centered around a GA DM-140 turnkey processing system and related software purchased by Brown in late 1975 to help distribute complimentary textbooks and university professors. The system was supposed to eliminate, or at least limit, duplicate book mailings - a common problem in the publishing industry, according to the publisher, Larry Brown. Unfortunately, the computer "never actually worked" and

(Continued on Page 8)

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# Match of AFDC, Detroit Police Rolls **Brings 33 Arrests for Welfare Fraud**

By Jake Kirchner

CW Washington Bureau

DETROIT - Thirty-three members of this city's police department have been fingered by a crime-fighting computer project and charged with welfare fraud.

The 33, all women, were indicted Oct. 4 after their names surfaced in a computer match that compared police department employee records with Michigan's welfare roles. The women have been charged with illegally receiving benefits under the stateadministered Aid to Families with Dependent Children (AFDC) program.

DSS, headquartered in Lansing, performed the match at the request of the Detroit police department, according to Susan Stine, deputy director of the Special Operations Administration of Michigan's Department of Social Services (DSS). The police had heard several female employees were receiving AFDC benefits and wanted to identify any employee illegally receiving such benefits, Stine said.

Stine said she "was amazed and not too happy" when 33 women on the police force were found on both lists.

#### Irony of Matching

Not everyone has been enthusiastic about the computer matching. The women caught will probably lose their jobs and end up on full public assistance, thereby costing the taxpayers. more money than was saved by the match, Stine noted.

"A lot of people feel the matches we have done have not been all that fruitful," she said, but insisted the project's real value is that it is "a very good de-

Very few public employees will be tempted to commit welfare fraud in the future, Stine predicted, recalling that an earlier match involving state employees found several welfare cheaters on state legislators' payrolls.

#### Results of One Project

Michigan's matching program, similar to that employed by the U.S. Department of Health, Education and Welfare on the federal level (see story on Page 11), has been in operation for about two years.

During that time, DSS has performed several matches using employee data from private industry. The most controversial match has involved the "Big Three" automobile manufacturers, General Motors, Ford Motor Co. and Chrysler Corp. [CW, Jan. 23].

Despite public objections that such matches seriously infringe on the right of personal privacy, the auto makers turned over to DSS payroll information on their employees in Michigan. When matched against state welfare roles, 5,079 "raw hits" were made.

Of those 5,079 people found to be receiving AFDC benefits, Stine said, 707 cases have, as a result of DSS investigation, resulted in "closures or reductions." The cut-offs and reductions of AFDC benefits in those cases have produced a monthly savings to the government of \$176,840, according to DSS figures.

Stine said there are approximately 2,300 cases from the auto makers still to be investigated, and no legal action has yet been taken to recover the fraudulently obtained money or to prosecute those caught in the match.

#### **Private Sector Eager**

Addressing the privacy issue, Stine agreed that some people find the matching program objectionable, but described the availability of computerized personal information as "the kind of world we live in now.

In fact, she said, not only have many private companies been eager to cooperate with the matching program, several have requested DSS investigations of their employees. Several matches have been performed on the premises of private companies using the firms' computers and AFDC tapes provided by DSS, she added.

In Washington, D.C., a spokesman for the HEW Inspector General's Office noted that private industry's voluntary cooperation with such matching programs is almost a moot point. In at least 37 states, welfare administrators have access to private employee records through state unemployment compensation insurance files, the spokesman pointed out. The insurance is paid by private companies for their

# On the Inside This Week

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# ADR's The LIBRARIAN® Online Speeds Program Development, Increases Productivity, and Bypasses Delays for Colonial Life Insurance Co.

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The LIBRARIAN/Online is a source program management system with complete Remote Job Entry and Remote Job Output facilities. Its interface to The LIBRARIAN gave Colonial Life online access with a full range of module updating and control functions.



Second Vice President Howard Lackow points to the steady increase in source code output since installation of LIB/OL.

The LIBRARIAN/Online is operational under both OS and DOS and supports CICS and other teleprocessing monitors. All of the updating functions available to programmers working in a batch LIBRARIAN environment can be invoked from teleprocessing terminals.

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# Women DPers Execute Smooth Runs in Boston

By Ann Dooley CW Staff

BOSTON - "If I survive this, I can do anything," DPer Naomi Karten said before joining the ranks of more than 4,000 women running in the second annual Bonne Bell Mini Marathon held here last week.

The women runners who surged along the 6.2-mile course through this city varied in age, occupation and running experience. The youngest was six and the oldest was 77. Many had never run competitively.

Karten, whose finishing time was 53:17, works as a project supervisor in programming financial and marketing applications for Massachusetts Blue Cross/Blue Shield. She started running about a year and a half ago.

Running has been dominating my life recently. My working day is usually filled with tensions and now I can go home and run for an hour and there's no room for any tensions," she explained.

Early this spring, she convinced her husband, CW staff writer Howard Karten, to join her, and he now shares her enthusiasm although he hasn't achieved her distances. A programmer since 1969, Karten said her job involves working with the system used for billing Blue Cross subscribers.

The race was "thrilling," especially at the beginning when all the women were grouped together. It was "like making our own parade," she said.

Karten runs approximately 20 miles a week and vows she will improve her time in the next race she enters.

Another DPer who ran in last week's race is Diane Mahany, a manager of engineering administration for Honeywell, Inc. One of Mahany's functions is to help allocate DP resources for the computer center. The center's resources are shared among departments and the time and equipment need to be managed properly, she explained.

Mahanny, who picked up most of her technical knowledge on the job, said she has "lots of fires to fight," and finds running a "fine way to come down from pressures.

Running gives me a sense of wellbeing that carries with me through the day," she noted.

A runner for two years, averaging three to five miles per workout, Mahany said she'd never seen so many people in her life as were participating in the race. There was such a large crowd that it took nearly four minutes just to begin running, she noted.

Immediately after the event, Mahany felt somewhat let down." She ran in last year's race and had been planning and looking forward to the Bonne Bell all year, so the race itself seemed to go

by too quickly, she said.

# Eclipse Line Grows at High, Low Ends

(Continued from Page 1)

The Cobol enhancement consists of an automatic segmentation feature that reportedly permits the execution of programs whose memory requirements exceed an Eclipse computer's typical main storage capacity. As a result, users can run arbitrarily large programs without recompilation, the spokesman explained.

The other enhancement allows Infos to use applications programs written in PL/I. Fortran ·V and DG/L. Before the software announcement, the file management product accommodated only Cobol and RPG-II-written pro-

grams.

DG likened the expanded M/600 version in performance to the Digital Equipment Corp. Decsystem 20 and Prime Computer, Inc. Model 500. Unlike those two competitive systems, however, the latest high-end Eclipse model incorporated a three-level I/O management systen consisting of a 10M-byte multiplexer channel, independent I/O processor with an Eclipse instruction set and a 64K-byte local memory that serves as a front-end processor for low-speed peripherals.

The C/150, by contrast, belongs to the same product class as the DEC PDP-11/60 and the Hewlett-Packard

Co. 3000 Series 33.

But whereas the HP Series 33 has no communications capabilities present, the C/150 can use the RJE80 protocol to communicate synchronously at up to 56k bit/sec with either of the other two members of the Eclipse series.

Expanded-memory versions of the M/600 will typically operate in the classic DP room environment, where they will perform applications like payroll and budgeting, the source explained. Typical C/150 systems, on the other hand, will serve relatively simple application like order entry and data inquiry, while transmitting information from a remote locations to a

The level-entry system, however, will also serve as a stand-alone unit, the spokesman stressed.

DG credited the C/150 with providing a 600-nsec machine cycle and supporting up to 256K bytes of main memory, eight 190M-byte disk units, 32 terminals, multiple 800- or 1,600 bit/in. tape units and 900 line/min printer. A realistic C/150 configuration, however, incorporated a 192Kbyte CPU, 20M-byte cartridge disk subsystem, five Dasher CRT terminals, one 800 bit/sec tape system and a 180 char./sec Dasher LP2 printer.

#### **Distributed Processing Capability**

To make the C/150 suitable for distributed processing applications, the system is software-compatible with both the C/350 and the M/600, the spokesman said. Software shared by the three systems inclueds DG's Real-Time Disk Operating System (RDOS), Interactive Data Entry/Access (Idea) package and Infos.

The C/150's Idea software typically supports six to 12 users and is upward-compatible with the C/350

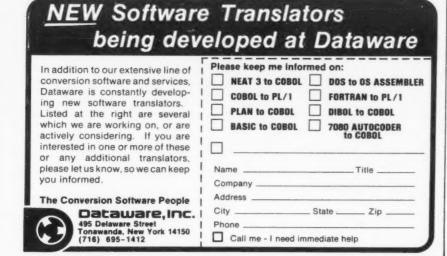
and M/600.

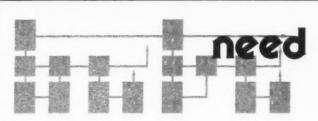
To further ensure the C/150's suitability for distributed processing, the system accepts the same DG peripherals as the C/350 and M/600. These peripherals include 50M-, 96M- and 190M-byte disk subsystems; 10Mand 20M-byte cartridge subsystems; 800- and 1,600 bit/sec tape units; and a choice of printers that output 30-, 60- and 180 char./sec as well as 300-,

600- and 900 line/min. A minimum practical C/150 configuration consisting of a 128K-byte CPU, 10M-byte cartridge disk subsystem, 800 bit/in. tape unit, 60 char./sec Dasher TP1 terminal printer, RDOS, Infos and RPG-II costs \$54,000. A typical maximum configuration with a 256K-byte CPU, 190M-byte disk subsystem, tape system, 16-line asynchronous line multiplexer, two Dasher CRT consoles, 12 additional Dasher displays, 600 line/min printer, RDOS, Infos, Idea and Cobol sells for \$144,000.

A typical enhanced M/600 configuration costs \$516,000 and incorporates a 1.5M-byte processor, 4M-byte fixedhead disk unit, two 9-track tape systems, six 190M-byte disk units, a 60 char./sec Dasher console, two 900 line/min printers, synchronous communications controller, 32 Dasher CRT displays, Advanced Operating System, Infos, Idea and Cobol.

Deliveries of the C/150 and expanded-memory M/600 start next January from DG at Route 9, Westboro, Mass. 01581.





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# Sometimes 500 at Once

# Mini 'Scores' With 3,565 Women Runners

CW Staff

BOSTON - While Bonne Bell Mini Marathon winner Joan Benoit set a record of 33:15 in the 6.2-mile, allwoman race here last week, a minicomputer tabulated her results and those of her competitors in "record time" for the event. The winner's time was announced only seconds after the 21-year-old Raleigh, N.C. student crossed the finish line.

A Honeywell, Inc. Level 6/47 computer was used to record finishes for the 3,565 runners who completed the race, which is named after the cosmetics firm. And that was quite a job, since at one point, as many as 500 runners crossed the finish line within 2-1/ 2 minutes, a Honeywell spokesman

For the first time, the Bonne Bell race used a computerized recording system donated by Honeywell, and officials seemed pleased with the speed and ease of computing the results. Last year it took months to record the times and distribute the results, according to Sherry Brooks, race coordinator.

The automated system used last week was similar to the one used in the Boston Marathon earlier this year [CW, April 24], although it has been upgraded considerably since that time, according to Honeywell spokesman Jim Hannigan.

#### Racer Program

Honeywell used a specially designed software program called Runner Administration and Computerized Entry Routine (Racer) to provide finishing times along with a variety of statistical reports.

As each runner crossed the finish line, a race official punched a button wired to the Level 6/47 mini to record the exact time of each competitor without using identifying numbers. Runners were then funneled through

a holding chute in the order in which they finished and runners' identifying numbers were written on a time sheet in order of finish. The numbers were then entered via CRT terminals on site and the system matched the order of the runners with the punched times to determine individual runners' times.

Chutes were closed after about 100 runners went through, and the finishing time sheets were numbered sequentially to denote which of the eight chutes a runner used. A group number was also assigned to each set of runners as they started through a newly opened chute.

As a further check, an official at the finish line wrote down the number of runners crossing the finishing line at 15-second intervals. The chute number, the group number and the manually recorded times were entered into the system for a three-way merge.

# Merge Program Helps

The merge program took all the runners' times and numbers, sorted them into overall finish order and arranged them into five age groups.

Because the program was written to work asynchronously, it stopped computing when sheets of numbers were entered out of order. Such a practice ensured that the output could be generated chronologically and correctly, according to Hannigan, who is manager of technical operations for the mini maker.

This was helpful during periods when runners were finishing the race in large groups because up to five CRTs were being used to enter the data, he explained. The mini's multitasking capability permitted data to be typed in at the same time the results were being printed out, he added.

The Level 6/47 used here last week had 256K bytes of memory. The process also involved five VIP 7200 CRTs and a 900 line/min printer.

#### **Data Storage**

tion entered into the system before the start of the race, were stored on 280Mbyte storage modules that included such data as the runner's height, weight, age, address, running club - ifand estimated running time. The latter was used by officials primarily to assign the runner's number.

The Racer program was written partly in Cobol and partly in Assembly language, Hannigan said.

Although only one overall list of finish times was printed on site, individual rankings will be printed and mailed to each competitor, he noted.

Runners were divided into five Finishing times, as well as informa- groups: 17 years and under, 18 to 29 years, 30 to 39 years, 40 to 49 years and 50 years old and over.

#### Only One Hitch

The whole operation went very smoothly; the only hitch occurred when a city electrician turned the power off, thinking no one was using it anymore, Hannigan said. But by that time, the race was over and cleanup has begun. The system came up about five minutes later and the work was finished, he noted.

Honeywell has donated its equipment and programmer time to the Boston Marathon for the last four years and had also helped in air races and other running races across the U.S.

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# Two CPUs Debuting at Info **Permit Double Emulation**

(Continued from Page 1) processing and special instruction support, permitting microcode implementation of such functions as communication subsystems and file management systems.

The execution processors, like the auxiliary processors, are microprogrammable by the user; they are responsible for fetching, decoding and executing instructions.

Different types of execution processors can be intermixed within the same system - up to two for the smaller system and up to four for the larger one allowing the system to simultaneously emulate two different mainframes, such as an IBM 370/138 and another system, the spokesman said.

One of many benefits of this approach is that it allows systems programmers and applications program-

A Company

To 'Emulate'

BUFFALO, N.Y. - Nanodata

Corp. was formed in 1971 and, in

its early days of operation, was

technology research and develop-

ment activities. These R&D efforts

culminated in the production of the

general purpose computer system in

That system was "specifically de-

signed to allow the user to emulate

any computer," according to the

The emulators Nanodata has de-

veloped so far - in all branches of

the military, major universities and

Fortune 500 companies, according

to the company - include those for

the IBM 360, Digital Equipment

Corp. PDP-11, Data General Corp.

Nova and 23 others.

in high-

engaged primarily

1974.

company.

mers to do their work at the same time, he added.

Storage on the VMX 200 ranges from 256K to 1.5M bytes, while the VMX 400 has a capacity of 500K to 8M bytes. Memory increments for both systems are sold in 256K-byte units.

#### Performance Comparisons

The memory, made up of 16K, dynamic NMOS chips, has a memory cycle time of 495 nsec and a machine cycle time of 175 nsec on both systems. This is said to allow the VMX 400 to execute a basic register-to-register (RR) instruction in .875 msec compared with a speed of 1.2 msec for IBM's 370/148, according to Nano-

The VMX 200 reportedly executes a register-index (RX) instruction in 1.5 msec, the model 400 in 1.09 msec and the 370/148 in 1.97 msec.

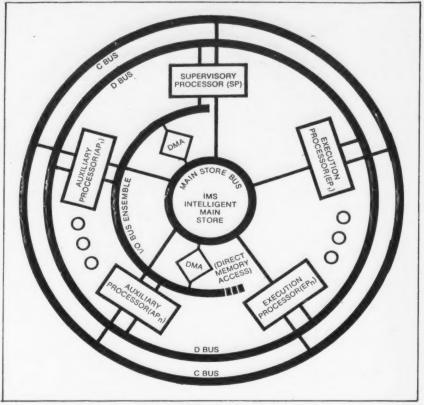
Channel implementation is provided by direct memory access (DMA) controllers acting as functional equivalents of either selector or block multiplexer channels. Each controller is capable of sustaining a maximum transfer rate of 7M byte/sec, while the system as a whole can transfer data at a maximum rate of 16M byte/sec, according to a spokesman.

A maximum of four byte-multiplexer and 10 high-speed (selector) channels can be configured on the VMX 400 in this manner, and a maximum of one byte-multiplexer and four selector channels can be used on the smaller

## Regional Offices Planned

Present marketing plans for the system call for establishing sales, system support and field engineering regional offices in New York, Chicago, Los Angeles, Dallas, Atlanta and Washington, D.C. Support will be provided by an as-yet-unnamed vendor.

As the number of installations increase, Nanodata will expand to 25 of



**VMX Machine Architecture** 

the largest metropolitan areas in the U.S. and provide its own field support, it said. The company plans to emphasize sales over leasing, although a full payout lease plan (but not an operating lease plan) will be available.

The systems will be offered with interfaces for standard minicomputer or IBM (including IBM-compatible) peripherals; alternatively, Nanodata will sell systems to users complete with minicomputer peripherals, the spokesman said.

#### Hedge Against Obsolesence

John T. Liebel Jr., chief executive officer of the eight-year-old Buffalobased company, said the idea behind the systems was to provide users with a hedge against obsolescence caused by present or unforeseen developments in technology. "We can create future virtual systems over a long period of time and offer the user a system that can accommodate technology as it develops,

and we can offer future products as extensions to the systems," he said.

The systems, which use TTL, ECL and Schottky design but do not incorporate CMOS chips, will not be limited to emulating only the IBM S/370, the spokesman emphasized. Users can work within the system's microcode to write emulators for other minicomputers, he noted, adding Nanodata itself will enter this market if there is sufficient customer demand.

Although current plans call for marketing both systems to end users strictly as systems, complete with standard minicomputer peripherals," discussions are currently under way with manufacturers who seek to integrate the systems into their own offerings, Nanodata said.

# Configurations, Prices

The company provided three examples to illustrate pricing on the system. An entry-level system consisting of a VMX 200 with 512K bytes of memory, a 300 line/min printer, 300 card/min reader, two high-speed data channels, tape and disk controller, two 40M-byte disk drives, one 60K-byte tape drive, diskette, CRT console/keyboard and diagnostic communications interface will sell for \$185,000.

An intermediate system, suitable for batch work or time-sharing use, is obtained by substituting a 600 card/min reader and 600 line/min printer and 300M-byte disk drives and adding a 16-line communication controller. This system will cost approximately

#### **Useful for Time-Sharing**

Expanding the intermediate system by substituting a 64-line communications controller, 1,200 line/min printer and two 120K-byte tape drives and adding an additional disk controller with two 300M-byte disk drives results in a system the company said is suitable for use as a large time-sharing system. The price tag on this system will be approximately \$500,000.

The number of processors on each system is field-upgradable, and the VMX 200 is "probably" field-upgradable to the VMX 400, the spokes-

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# Says Profit Picture Distorted

# IBM Witness Hits Memorex, Telex Accounting

NEW YORK - Both Memorex Corp. and Telex Corp. engaged in "inappropriate" accounting practices to make them look more profitable than they were in the 1960s and early 1970s, according to an IBM "expert" witness who took the stand last week in the U.S. vs. IBM antitrust trial here.

The testimony of Abraham J. Briloff, a professor of accountancy at the Bernard M. Baruch College of the City University of New York, was apparently sought by IBM in order to back up its contention that the problems of its plug-compatible peripherals competitors were self-induced rather than the result of monopolistic action by

Briloff discussed his investigations into what he called "misleading accounting practices" which he has "exposed" time after time in national publications over the last decade.

The professor said the source of many such actions was simply the time - the "go-go years" of the '60s. At that time, it appeared the "supposedly sophisticated financial community had lost its reason.

He said that such "glamour companies" as Litton Industries had completely captured the excitement of Wall Street and offered "dazzling potential and implications" for investors with 'incredible" price/earnings ratios in the 80/100 range.

lines presented "a blissful potential" to investors, they were derived through gamesmanship" and not financial reality, Briloff testified.

He cited articles he published about Telex (1970) and Memorex (1972) that revealed the same conceptual framework for both companies. The Telex article, which appeared in Barron's on May 11, 1970, resulted in a \$110 million law suit against Briloff and Barron's. Telex claimed the article single-handedly caused its stocks to drop by \$55 million.

Briloff said the distortions in financial statements arose from pooling of interests accounting, which he referred

Although these companies' bottom to as "buying earnings." He gave a hypothetical example of a company that buys property shares for \$100 million and accounts for it as if it cost \$10 million. The company then sells the hares for \$90 million, actually taking a loss of \$10 million, but reporting a profit of \$80 million.

Briloff, who has published many articles dealing with the same and similar acounting-oriented subjects, said his main concern is for more honesty, candor and openness within the accounting profession. He testified last May on IBM's behalf in the Memorex vs. IBM antitrust trial and a month ago before the Senate Subcommittee on Antitrust and Monopoly.

# And Then There Was One

NEW YORK - The IBM defense team dropped another witness from its list last week in the U.S. vs. IBM antitrust trial here.

The dropping of "expert" witness Thomas I. Unterberg, underwriter and partner in the firm of C.E. Unterberg, Towbin & Co., continues IBM's recent pattern of actions aimed at speeding up this trial now in its fourth year [CW, Oct. 2].

Although the action will undoubtedly help speed things up, it is not without its negative effects on the government's legal team. According to lead government attorney Robert Staal, Unterberg had been deposed by the government; therefore, his being dropped constitutes "additional wasted effort" on the government's part.

Staal said the government is now down to only one other deposed witness. "We're scrambling," said about the government's effort to be prepared to cross-examine IBM witnesses each day in court.

The government lawyers will take several depositions in the next few weeks and hope to "get back in a good position" in that regard.

# **NBS** Releases COM Standard

WASHINGTON, D.C. - The National Bureau of Standards (NBS) has issued "the first in a series" of standards for microimage output from computer output microfilm (COM)

Federal Information Processing Standard (Fips) 54 establishes formats and reduction ratios for computer-generated 16 mm and 105 mm micro-

The standard was developed by Federal Task Group TG-18, an interagency committee established to recommend COM standards.

Fips 54, Specifications for Computer Output Microform Formats and Reduction Ratios, 16 mm and 105 mm is available from the National Technical Information Service, U.S. Department of Commerce, Springfield, Va. 22161, at a cost of \$4 in hard copy or \$3 in microfiche form.

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# The Longer Zip Code: Don't Panic, Plan Ahead

(Continued from Page 1) financial reward, he commented.

In response to an obvious question, the spokesman added that the changeover to a nine-digit code will be the last such shift. There is no plan or serious thought being given to even longer codes, as some people have suggested.

#### Two Areas of Change

Given that admittedly sketchy framework, DPers see their work falling into two basic areas - changing programs and data files or changing data bases with more changes in programs and external documents possible later, when the Postal Service specifies how the longer Zip Code should be shown in addresses

The modification of programs will vary from installation to installation, although some general patterns may develop. The biggest single pattern of change obviously will be to get sorts adapted to key on a nine-digit field instead of the five now used

Other changes appear to be limited to such things as the minor coding needed to link the five-digit Zip Code and the four-digit add-on if they cannot be stored as a single field.

The data storage changes will vary, largely dependent on whether the installation is using conventional files or structures under a data base management system. And how the file users attack their Zip-related problem will depend largely on how they have built the files until now.

For example, a file-oriented shop that has been very tight in its file layouts, with no filler space, is going to have to do more than the center that has been a little looser, leaving some space (at least several bytes for our current needs) for the changes that mark any viable and flexible system.

Even if no other changes are needed, the tight files will have to be redefined to allow space for the nine-digit Zip Code. This is one place where longrange planning may pay off.

Although four digits have to be added, they may in fact not take any more space than the current five-digit code. But to accomplish that minor miracle takes a byte-oriented machine, a current character-oriented representation of the five digits, a switchover to a packed presentation of the nine-digit code and the relatively minor coding needed to pack and unpack the digits when they are moved in and out of the machine

Users already storing the "short" Zip Code in packed form will have to add two bytes to each record for the four extra digits, and users working - and staying - with character representation will have to add four bytes per record.

Users with the more open, FILLERextended files can probably put the extra four digits in the unused space and patch coding into their programs to work with those digits, even without recompilation. This approach is errorprone, however, and likely to give nightmares to a DP auditor or any one else with a sensitive stomach, so even here recompilation is the recommended path.

The data base-oriented installations face the problem in much the same

way as the users with the flexible files, except that recompilation of programs just to accommodate a file change even if the change doesn't affect a given program - are not necessary. Data independence, the battle cry of the data base management system (DBMS) advocates, proves its value in this situation; only programs with logic changes will have to be regener-

But away from the programs, the data base administrator (DBA) whatever his title - has to adapt the physical and logical data base structure so users who need to access the ninedigit Zip Code can do so.

In this task, the DBA must make the same choices of internal representation - packed or character - that the file manager faced, with the same considerations of space saved vs. pack/unpack coding to be added.

It may be that the move to the longer Zip Code, a decision essentially outside the control of the DP manager or the DBA, seems a compelling argument in favor of DBMS. But that's too simplistic: a DBMS is useful, especially in a situation such as this, but careful planning with conventional files can be just as productive.

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# User Wins Suit Against GA

(Continued from Page 1) Brown Publishing was forced to distribute the textbooks manually at an of approximately alleged loss \$500,000

"It was suppoed to run up to 32 terminals concurrently," Brown said, "but once we put two terminals on the [system], it would crash."

The publishing firm claimed that although the system was billed as a 'turnkey" computer, none of the hardware/software "pieces" seemed to fit. GA's technical staff allegedly tried to assemble, program and debug the system — all at the same time — for three months without success. "We were never in a position where we could test the machine from a business application standpoint," Brown observed.

The system's problems were finally traced to its operating system, although GA's engineers still didn't know how to fix it, Brown continued. 'We'd never had a computer before, so we didn't know what an operating system was.

### **Brought in Consultant**

Brown Publishing eventually hired an outside consultant to evaluate the inoperative minicomputer system. The consultant subsequently discovered that problems with the DM-140's operating system were common to nearly every one of the machine's installations. "That's when we shut the doors," Brown declared.

GA contends, however, that the problems surrounding the DM-140's operating system could have been solved if the firm had been given a little more time. "I think there's no question that we had a schedule we didn't meet," Irwin Kwatek, GA's general counsel, said. However, "I don't believe our software is inadequate; it could have been made to work."

In the "world of computers," three months is a reasonably short period of

time, GA's counsel contended. "At the time [Brown Publishing] kicked us out, we were getting pretty close [to a solution] but...they, so to speak, got nervous and sued us.

GA, however, does not intend to appeal the court's decision, Kwatek said.

David Bauer, Brown Publishing's attorney, insisted that GA showed little sign of resolving the DM-140's problems and that eventually "it just came down to fighting."

In an unrelated instance, the Datapro Research Corp. of Delran, N.J., released a report on minicomputer systems last March which rated the DM-140's operating system as poor. In a survey of 14 users, representing 65 installed systems, the minicomputer's SPC-16-based software, on a scale of one to four, was rated 1.9 (weighted average).

Further, GA's technical support, on the same scale, was scored 1.8, prompting Datapro to comment. Based on the responses from [the 16] users, it's clear GA has some homework to do."

GA, however, dismissed Datapro's survey and disputed the report's conclusions. "I believe we have about 2,000 SPC-16s out," GA's counsel stated, "so a survey of 16 users is not necessarily indicative of what hap-

GA believes the legal imbroglio with Brown Publishing, rather than being a defeat, was a victory of sorts. "We had tried to settle this lawsuit several times in the past with approximately the same amount that was awarded Brown Publishing," Kwatek stated. "Brown saying it was going to go for fraud and look for millions of dollars and we believe the company didn't even cover the cost of taking us to

"We feel very strongly that we've been vindicated...we never for any moment thought we were guilty of fraud," Kwatek asserted.

# On Military, Economic Grounds

# Study Sees No Cause to Bar DP Exports to East

By Jake Kirchner

CW Staff WASHINGTON, D.C. - There is no military, economic or political reason to deny exports of sophisticated DP equipment or technology to Eastern Bloc countries, according to a study released here by the Brookings Institu-

When everything is taken into account," the study said, "the basis for special concern about the export of technology to the East, as contrasted with exports of the general range of goods and services, appears to be quite

Discussing military-related DP, the report quoted a Rand Corp. study that found Soviet computer capability to be adequate to it's military needs.

To the extent that the best Soviet computer, the BESM-6, fell short of meeting needs, greater use of time, labor and other resources enabled the Russians to prdouce achievements comparable to those of the West's more computer-intensive defense policy," the 1974 Rand Corp. report was quoted as saying.

Furthermore, the Brookings report stated, the U.S. military seldom uses computers more sophisticated than those available to the Soviets. When it does, there is little evidence of substantial difference in capabilities from those the Soviets obtain or would desire, given their defense policies, the report added.

In short," according to the study, "a sufficiently strict export control system might deny to the USSR least-cost solutions to military DP problems, but it probably could not prevent the Soviet military from achieving satisfactory solutions.

The report is the result of work sponsored by the Kiel Institute of World Economics and the Japan Economic Research Center along with Brookings. The study is entitled "Economic Relations Between East and West: Prospects and Problems.

#### No Ecomonic Boost

Addressing possible economic reasons for withholding technology from Eastern Bloc countries, the study asserted that imports do not allow Communist countries to significant increase economic growth or improve production.

Soviet imports of machines have amounted to less than 2% of total machinery investment," the report noted. "Even if one assumes that the productivity of such imports is two or three times as great as the productivity of new domestic machinery, the effect on the rate of growth would only be mar-

In addition, labor-intensive economies such as that of the Soviet Union are not greatly aided by increased automation, the report pointed out. Also, the rigidity of the Soviet centrally planned economy has "limited the upand improvement of imported technology, which has been done, for example, in Japan.

Turning to the other side of the economic issue, the effect on exporting countries, the study said exporting technology to Eastern countries does not significantly reduce product markets there ,because the world market is

In addition, to the extent that imported technology does increase exports from the East, the Eastern countries will be better able to pay for additional imports, the report noted.

The effect will be to increase trade in both directions, and any loss of markets through Eastern competition is pat to be offset by the expenditure of increased export earnings in the West."

#### Effect on Bargaining Power

It "seems doubtful," the report continued, that withholding technology exports would increase the bargaining power of the West in noneconomic issues. This was seen as true for several

 "The technology in demand in the East is usually available from many nations and through a variety of chan-

"The feasibility of gaining the cooperation of suppliers of technology, which are competing with each other, to organize an effective monopoly is

• Such arrangements would run up against antitrust laws in many Western

Given the relatively modest gains accruing to the East, particularly the Soviet Union, from imported technology and its strong commitment to political objectives, it seems unlikely that

significant concessions on noneconomic issues could be gained by using technology as a bargaining chip," the report said.

At best, such an attempt, for most types of technology, would only delay, rather than deny, access," the study concluded.

In fact, if the West wished to exert maximum economic and political pressure on Eastern countries, controls on the export of wheat and other grains offer the best prospects.

The study added that its conclusions concerning trade in technology with Eastern Europe are applicable to China

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# Library Users Get Fingertip Access to Sources

By a CW Staff Writer ATHENS, Ga. — Library officials at the University of Georgia are nearing the end of a four-year system development project aimed at bringing information on several million books and documents to the fingertips of library

Called Managing Resources for University Libraries (Marvel), the system was designed in-house, according to John G. Christoffersson, because the library acquires new materials in so many ways that off-the-shelf types of library systems products can't handle

Christoffersson, assistant library director for systems and services, explained, "It's easy to write a system to trace an order for a book and then pay for it when it comes in. And many [vendors] coming in off the street can do this for you," but their aim is an integrated system that processes all books, periodicals and standing orders and also handles bill payment.

The library has "[5,000] standing orders with publishers for books in certain categories like computer science, example. When a book is published in one of these series, it is automatically sent to the library" without any specific order form being sent out. "We often don't know when a book has been published or when it's going to come in," he said.

The library must also manage its 13,000 subscriptions to various publi-

In addition, "we belong to the Association of Research Libraries and don't know in advance what kind of materials we are going to be receiving from

that group. Finally, the library places orders with individual publishers for specific books, he said.

At the moment, library employees are putting the card catalog into a large data base. About a quarter of a million records have been entered to date, and ultimately, two million to three million records will be in the system, Christoffersson estimated.

The system is being operated on one of the university's IBM 370/158s. At the present time, according to Christoffersson, the library is using about 25% of the capacity of the 5M-byte 158 for the project and is the single largest time-sharing user of this sys-

The library's 158 has CICS for online applications and Vsam for file maintenance, Christofferson said. Tcam is used for access and as a Christofferson said. lower level teleprocessing monitor, and TSO is used for entering information into the data base.

At present, the system is only being used by the research staff and probably will not be ready for use by the public for six more months.

# Requests Filled in Seconds

Working from computer terminals in the main library or science library, researchers can type in their requests for information and, within seconds, all pertinent information relating to the request will be transmitted from the 158 and displayed on the terminal's

Our on-line system will drastically reduce the need for a [physical] card catalog and may eventually replace it entirely," he said.

"Unlike a card catalog, where you must know the author and title in order to find a book, Marvel will honor requests even when only the author or part of the title is known," Christoffersson said.

The system will also tell the user if the material is available, where it is located, if it is on order and for how long it has been on order. If the material is not in the library's collection, the system will tell the user how an order may be requested directly from the termi-

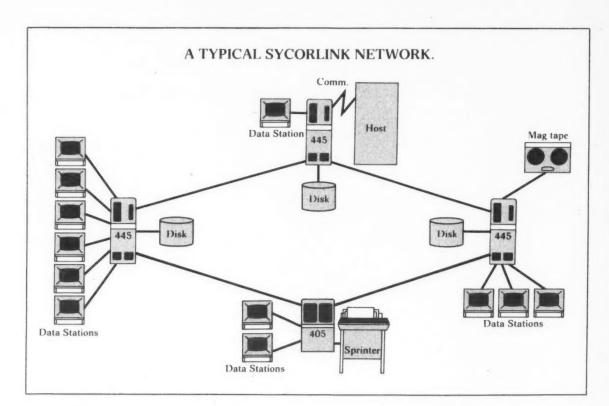
'It's not uncommon for publishers or wholesalers to take weeks and even months to supply library materials," Christoffersson pointed out. "This causes problems for researchers who may be waiting for books but won't know for some time if the material has arrived.

We've taken care of this by entering into the computer the bibliographic information on material as soon as such information becomes available. This information is then updated regularly, providing the user with a current status report on each library item of interest. Periodicals, maps, phonograph records and other items as well as books can be entered into the com-(Continued on Page 12)

Library users at the University of Georgia can use CRT terminals to obtain information on more than a million and a half items of library material.



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# As Result of Project Match

# Fifteen D.C. Women Indicted for AFDC Fraud

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Fifteen women have been indicted here as a result of a federal computer project designed to detect welfare fraud.

In Project Match, initiated by the Department of Health, Education and Welfare (HEW), the computerized roles of the department's District of Columbia employees were matched against computerized files of women receiving money under the Aid to Families with Dependent Children (AFDC) program [CW, Nov. 21].

The AFDC lists were supplied by the District of Columbia government, overseer of the program which is 55%

financed by the federal government.

The 15 women, 11 current and four former HEW employees, were indicted in U.S. District Court for the District of Columbia Sept. 27, according to an HEW spokesman. They were charged with mail fraud and false pretense.

Robert Wilson, spokesman for the HEW Inspector General's Office, said the indictments are the result of a pilot program of Project Match involving only the District of Columbia. The project is now being expanded to cover all 50 states, he said, and HEW expects "quite a number more [indictments] around the country."

Project Match is one of three programs begun recently by HEW that

uses DP to detect fraud against the federal government.

In the District of Columbia pilot program, the D.C. Department of Human Resources supplied its AFDC lists to HEW. Wilson said HEW found 216 of its employees had received AFDC benefits. Those 216 were then reevaluated by the D.C. government for eligibility for such aid.

Wilson emphasized that "an elaborate system of controls" was used to mask the identity of those screened in the match until it was decided which cases should be referred to the U.S. attorney's office for possible legal action.

According to the HEW spokesman,

the department uses two criteria for referring cases for legal action: the person must have received "apparently improperly" \$2,000 or more in AFDC payments and the person must have income of at least \$10,000 a year.

Using those criteria, Wilson said, eventually 20 names were sent to the U.S. attorney's office here. HEW estimated that 15 women received approximately \$75,000 in fraudulent welfare payments, he said.

#### **Estimated Savings**

Project Match, which has cost the government about \$1 million so far, will produce an estimated first-year savings of at least \$12 million, Wilson said.

This figure is based on a \$2,000 per case per year average, although the figure could be low because it does not include Medicaid benefits and food stamps that might also be received fraudulently, he said.

HEW will take no departmental action against the 11 current employees indicted unless they are found guilty. However, all 15 women have been denied further AFDC benefits, he added.

Two similar HEW projects have produced a flurry of legal action over the last year. Project Cross Check has so far this year prompted legal action against some 2,000 people found through computer matching to have defaulted on government-guaranteed student loans, according to Wilson.

Project Integrity, designed to detect possible Medicare and Medicaid fraud by screening billings to the programs by doctors and pharmacists against 26 norms or "parameters," has already resulted in 17 indictments and seven convictions, according to Wilson. An additional 590 cases are currently under "full investigation," which could lead to criminal charges, he added.

# DPers Notified Of CCP Deadline

CHICAGO — Programmers can register until Nov. 1 for the Certificate in Computer Programming (CCP) examination, slated for Dec. 9.

That announcement was made last week by the Institute for Certification of Computer Professionals (ICCP).

The CCP examination for seniorlevel programmers covers a common core of knowledge and an area of specialization: business, scientific or systems, an ICCP spokeswoman said.

Applications and study guides are available from the ICCP, 304 E. 45th St., New York, N.Y. 10017.

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Millson, secretary, Association of Data

Base Producers, c/o Learned Informa-

tion, Besselsleigh Road, Abingdon, Oxford, QX13 6EF, England; or Paul

G. Zurkowski, president, Information

Industry Association, 4720 Montgom-

ery Lane, Bethesda, Md. 20014.

ternational information pipelines.

LONDON — A one-day conference focusing on issues affecting data flow across international boundaries and the future of electronic information exchange will be held here Dec. 4.

The conference is being organized by the International Secretariat for Transborder Data Flow, an organization its founders say emerged from privatesector concerns over increasing restrictions on the flow of information across national boundaries.

Two organizations have been established by the secretariat — the Association of Data Base Producers (ADP) of Great Britain and the U.S. Information Industry Association (IIA).

About five specific concerns gave rise to the secretariat, according to Paul G. Zurkowski, president of IIA and secretary general of the secretariat.

One is the multiple and varied links in the chain through which electronic information is marketed.

A second concern is the extension of increasingly complex regulations governing each of these links.

Third is the emergence of externally developed information (bibliographic, econometric, financial and social data bases) as economic goods in interna-

# Library System Eases Access

(Continued from Page 10)

puter, he said.

Unlike manual systems which can require as many as 40 duplicate cards scattered through some 20 different files, the Georgia library system uses only one specially coded record for each item placed in the computer. The entire record, or selected portions, may be retrieved, depending on the user's request (24 different screen displays are available), from any terminal in the system.

By eliminating cards, the system will also help reduce the amount of paper used in operating the libraries. The libraries now file some 3,000 cards in their catalogs every working day.

According to Christoffersson, "A user may find an item displayed that should be changed. Instead of copying the text on a piece of paper that's sent through the mail, the user enters into the terminal any comments, plus the recipient's name or department. When the terminal is checked for messages, the display and the user's comments will appear for the addressee.

"Of course, we'll still use paper to communicate with an outside source, such as a faculty member, a student or anyone who does not have access to a terminal; and to a vendor or supplier, who needs a written purchase order,"

About 60 IBM 3278 CRT terminals are expected to be installed in the libraries on the University of Georgia campus. The system will also be available to other institutions within the University of Georgia system by means of locally installed terminals connected by telephone lines to the university's central IBM computer in

About \$1 million has been spent on the project to date, Christoffersson said.

# Data Flow

CAMBRIDGE, Mass. — MIT and City of Cambridge officials have received a three-year, \$318,000 grant from the U.S. Department of Health, Education and Welfare to design and install an experimental computer-based information and learning service for public use at the city's public library.

The completed prototype system will permit easy access to a wide range of basic information, MIT said, including details on delivery of municipal and private human services.

Using a terminal which has no keyboard and requires no typing, the prototype system will permit easy interaction by the user, MIT noted. Users will be able to ask

questions of the system, which will reply on a CRT screen.

In addition, it will be possible for a user to read through large amounts of material and select specific information to be printed, according to MIT, which added that terminals can be set up in different neighborhoods of the city.

The user-oriented service center will also provide learning programs for reading and writing basic English and for practicing mathematical skills.

The grant proposal will be carried out by the MIT Division for Study and Research in Education, in cooperation with the Cambridge Public Library and the Cambridge Office of Community Development.

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# Proposal to Go Before CAB

# Reservation System May Aid Travel Agents

By Jake Kirchner CW Washington Bureau

WASHINGTON, D.C. — After years of experimentation and discussion, U.S. airline and travel agent representatives have agreed on an organizational framework designed to promote fuller automation of travel agency work.

A proposal will soon be before the Civil Aeronautics Board (CAB) to form an entity to be known as Multiple-Access Agent Reservations System, Inc. (Maars, Inc.), which would promote and coordinate travel agency automation.

At a meeting here Oct. 6, representatives of 12 U.S. airlines, the American

Express Co. and the American Society of Travel Agents (Asta) culminated a two-year travel agent/air carrier automation project by agreeing to ask for CAB approval of Maars, Inc.

Bylaws of Maars, Inc., drawn up by representatives of the 14 organizations taking part in the automation project, provide for a not-for-profit corporation whose functions would include contracting and interfacing between and among hardware and software vendors, communications vendors, airlines, trvel agents and other end users of automated reservation systems.

CAB consideration of the proposal could take "from two months to two

years," according to Bernard Diederich, CAB attorney, who was an observer at the Oct. 6 meeting.

# 'Beginning of New Era'

The proposal, which Asta President James A. Miller termed "the beginning of a new era," is the result of attempts by Asta started in the early 1970s to find a system that would allow travel agents to access many airlines' seat reservation systems using a single system.

In 1976 the CAB gave the 12 airlines — 11 national and one regional — antitrust immunity to discuss with Asta and American Express the feasibility of developing a multiple-access reser-

vation system.

Asta represents more than 50% of the approximately 13,500 U.S. travel agents, according to an Asta spokesman, and more than 70% of all travel agency billings. American Express operates its own group of travel agencies.

A.J. Foster, Asta's director of automation systems and operations, said his organization invited all U.S. Air carriers to participate in the project with the association and American Express. The 12 that accepted include some of the largest in the country, such as American Airlines, Delta Air Lines, Inc., Eastern Air Lines, Inc., Pan American World Airways, Trans World Airlines, Inc. and United Airlines.

The 14 participants each contributed \$25,000 for a total project budget of \$350,000 and chose three systems vendors for separate five-month pilot projects in three cities: Vidicom Ltd. in New York City, Tymshare, Inc. in Chicago and Honeywell, Inc. in Seattle.

The last of the pilot projects ended in late August, and according to Foster, the three systems were well received by participating travel agencies. "Overall, we're very satisfied with the results," he said. "The pilot project has proved the feasibility of the [multiple-access] system."

#### Access Via One CRT

Essentially, Asta wanted to develop a system that would allow agents to access many airlines using a single CRT terminal, Foster said. He predicted that eventually every travel agency will have to automate in order to remain competitive and stay in business.

Although travel agency automation systems are currently available from hardware vendors and several airlines, including American Airlines and United Airlines, many travel agencies have found these systems too expensive or difficult to obtain, according to one project participant.

Many travel agencies that have automated have had to lease individual terminals for each airline and car rental firm an agent wishes to access, according to a Honeywell representative at the Oct. 6 meeting.

Bill Boone, manager of business development, minicomputer marketing operations, for Honeywell, estimated that an average-size travel agency, using four CRTs and one printer, would currently pay about \$725/mo in

(Continued on Page 14)

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# ICN Seminar to Focus On Third-Party Leases

WINTER PARK, Fla. — International Computer Negotiations, Inc. (ICN) will sponsor a three-day seminar on third-party lease negotiations Jan. 22-

Instructors for the course are Joseph Auer, president of ICN and an internationally known consultant on computer contract negotiations; Kenneth C. Brindle, vice-president of ICN and a frequent lecturer on computer negotiations; and Richard M. Contino, practicing attorney, business consultant and author of the soon-to-bepublished book Legal and Financial Aspects of Equipment Leasing Transaction.

The course will include a detailed review of the potential problems that can arise in third-party contracting as well

as instruction on how to optimize the financial aspects of a third-party leased-equipment acquisition.

Other topics will include creating the proper balance between price and protection; negotiating in leasing situations; leasing considerations, including types of leases and sources of funding; and drafting and analyzing a lease document.

The course will also cover investment tax credit, depreciation advantages and the advantages and risks of leveraged leasing decisions, according to ICN.

Registration for the seminar, which will be held at the Langford Resort Hotel in Winter Park, Fla. is \$595. Further information is available from ICN at 1331 Palmetto Ave., Winter Park, Fla. 32789.

# Organization Would Aid Travel Agency Automation

(Continued from Page 13) equipment rental and about \$300 in monthly communications connection costs.

Foster agreed with that estimate and predicted that systems approved by Maars, Inc. would probably be offered at basically the same price. Such systems, he said, might initially offer air carrier reservation services, ticket printing and value-added services such as accounting.

# Honeywell System

For example, the system Honeywell used in its part of the pilot project included one Level 6 minicomputer with 64K bytes of main memory and 10 million bytes of disk storage, 15 VIP 7700R terminals and six printers, two for each of the three Seattle agencies Honeywell served.

In addition, Honeywell developed a Maars software product written in Assembly. The software will be offered on a licensed basis, the company said.

Besides performing standard reservation functions, the Honeywell system can be enhanced to provide back-office accounting functions and to accommodate "city pairs" — special listings of airlines with connecting flights in each city, the company said.

Honeywell, already "aggressively marketing" its system, according to Boone, is one of several companies now offering Maars packages. It is not clear what effect, if any, Maars, Inc. will have on those systems now available.

The Maars, Inc. proposal, to be submitted to the CAB within the next few weeks, describes the organization as being responsible for providing minimum standards for hardware and software vendors; establishing an interface protocol for communications vendors; and coordinating air carrier schedules, communications connections and DP systems.

The proposed corporation would not have legal regulatory authority and would operate only in an advisory capacity except when it might undertake contractual obligations, such as the provision of airline schedule information to the communications and hard-

ware vendors who would in turn supply the information and their added services to travel agents and other end users.

Hardware and software vendors would do their own marketing and provide installation and maintenance and user training, according to the proposal.

In addition, International Telephone and Telegraph (ITT) has announced the formation of a wholly owned subsidiary, ITT Electronic Travel Services, to offer communications services to the travel industry. According to an ITT spokesman at the Oct. 6 meeting, ITT plans to work closely with Maars, Inc. but will begin operations during the time the CAB is considering the Maars, Inc. proposal.

The proposal provides that the corporation will have as members one representative from each of the 14 original project participants. Other parties to various reservation systems, such as other airlines, would be allowed to join as "associate members."

The proposed bylaws state "it is contemplated that foreign air carriers will become associate members" provided they reciprocate in providing information on their schedules and services. Associate membership will not be based on arbitrary or discriminatory considerations, the bylaws add.

The CAB could make a decision on whether to approve the formation of Maars, Inc. in as little as two months, the CAB's Diederich said. He noted that the board has followed the project for its two-year span and "is ready to process this matter."

However, he said, if the CAB decides full evidentiary proceedings are required, the matter could take as long as two years.



# For Water Supply Forecasts

# System Processes Data on Mountain Snow

By Marguerite Zientara CW Staff

PORTLAND, Ore.-A computer system has been coupled with the "largest data acquisition system in the world" by a unique telecommunications setup in order to provide up-to-date information on snow cover in the Rocky, Sierra Nevada and Cascade mountains.

information on the snow buildup in these mountains, which varies from 40 to 100 feet, is important, the system's developers said, because the mountain snowpack accumulated during winter and spring provides more than 70% of the western states' water supply during the year.

Weather researchers need information on the buildup in order to be able to predict the timing of streamflows and their volumes as the snow accumulation melts.

Accurate information will provide the farmer with more accurate projections of water supplies for the season ahead and reservoir operators, irrigation districts and flood control agencies will be alerted to the time of expected high and low flows in the streams in their areas.

Previously it was nearly impossible, researchers said, to obtain up-to-date information on the snow accumulation because many of these mountain sites were only accessible by helicopter or snowmobiles during the winter and the rugged terrain made it extremely expensive to install relay stations for normal communications in the area.

For example, in the past, snow surveyors have traveled more than 10,000 miles a year by oversnow machines, skis or snowshoes in order to bring back the snow survey information used in computing water supply forecasts, the researchers said.

But the new remote stations - which are microprocessor controlled - and the "meteor burst" telecommunications system allow researchers to obtain data from more than 160 mountain sites on a regular basis, the researchers added.

The system, called Snotel ("snow telemetry"), which has been installed since the summer of 1977, was recently approved by the U.S. Soil Conservation Service (SCS) and is now available to all users in the western U.S., according to Paul Zoerb, project manager for Snotel at Systems Consultants, Inc. (SCI) of Emeryville, Calif.

SCI designed the applications software and communications interface for the project's computer system and also acts as technical monitor of the overall system.

#### **Remote Sensing Stations**

The system consists of 160 remote sensing stations, each presently configured with four sensors. The sensors measure the voltage of the solar battery that powers the remote station, the weight of the snow on the ground, number of inches of fallen precipitation and air temperature. Each station is based on an Intel Corp. 8080 microprocessor.

The solar-powered batteries at each remote site provide power for a small solid-state radio receiver and transmitter. Data can be read as often as every 15 minutes and held until it is re-

quested by one of two master collec-tion stations located in Boise, Idaho, and Ogden, Utah. Data transmission is immediate upon command with no equipment warmup required, according to SCI.

But since normal communications methods are not available to such remote locations, the developers turned to meteor-burst technology for transmissions from the remote stations to the computerized collection stations.

Each day billions of small meteorites — about the size of sand particles — enter the earth's atmosphere, leaving behind a trail of ionized gases.

These ionized trails exist for only a few seconds, but that is enough to reflect VHF radio signals from ground points up to 1,200 miles apart, the researchers said.

Radio signals are bounced off these vapor trails to the remote stations from the central sites and the information is automatically transmitted back along the same trail, they added.

Each of the two master stations can command any remote site or group of sites, Zoerb said. When data is received at one of the central stations, it is temporarily stored in a Data General Corp. Nova 3 minicomputer, with 16K words of memory, for later transmission to the SCS Water Supply Forecasting headquarters here.

At headquarters, the data is identi-

fied, checked for validity and stored for later retrieval. The Portland headquarters serves as the central information exchange and also offers larger storage and retrieval capabilities than are possible with the small computers at the central stations, Zoerb said.

The Portland CPU is a Hewlett-Packard Co. 9640A configured with two HP 7920 tape drives a 200 line/min Model 9866 thermal printer and a Model 12920B multiplexer, for interfacing with data communications circuits, Zoerb said.

Two HP 2640A CRT terminals in Portland, one on-line in the computer



# Datacon Speakers Set

ST. LOUIS - Edward Yourdon, president of Yourdon, Inc., Larry Welke, founder and president of International Computer Programs, Inc., and Jack Buck, nationally known radio and television personality and sportscaster, will be featured speakers at Datacon '78 here in December.

Sponsored jointly by the Data Processing Management Association (DPMA) and the Association for Systems Management (ASM), the confab is scheduled for Dec. 7-8. Yourdon will be Thursday's keynote speaker and Welke will speak on Friday.

The "Voice of the Cardinals," Jack Buck, will speak at Thursday's banquet.

For additional information, contact Hardie Wilson, ASM/DPMA, P.O. Box 1401, St. Louis, Mo. 63188.

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# Goldwater Urges Conference On International Data Flow

WASHINGTON, D.C. -The issue of transborder data flow communications is not some exotic, ethereal subject," Rep. Barry Goldwater (R-Calif.) told the House of Representatives recently on introducing a resolution calling on the President to convene a multinational conference on the subject.

The time has come for the U.S. to take a more active role in studying the issues of transborder data flows, he said, asking Congress to appropriate \$3 million for his proposed International Conference on Communication and Information.

conference, would be held before Jan. 1, 1980, would include delegations from "the principal industrialized nations," Goldwater said, and would be conducted under the sponsorhip of the Department of State.

The objective is to discuss all significant aspects of international telecommunications and transborder data flows and to have the Department of State submit recommendations to Congress for legislation or for an international convention," Goldwater told his fellow legislators on introducing the resolution.

Most of the other industrialized nations of the world are already devoting "direct governmental attention" to the subjects that would be covered by the conference, Goldwater said, adding that this attention is "serious and dedicated.

"It certainly is not transient. For example, the Council of Europe has moved from the phase of intellectual consideration and abstract discussion and study to asking for a draft multinational European agree-

However, lack of a firm U.S.

policy in the area has been greeted by some with silent, polite embarrassment and by others as a golden opportunity to trim the sails of U.S. industry and competitive dominance," he said.

#### 'Suffers by Comparison'

"For understandable, but unfortunate reasons, the U.S. suffers by comparison to the interest and actions of other nations," and while interest and attention to the subject is growing here, Goldwater said many of our key policymakers have the mistaken belief that we have three or four years before we must confront this issue.

"As a result, the best that can be said of our activities, and I candidly include myself in this statement, is that we are discussing the matter in little more than tearoom fashion."

To date, the Department of State has developed a joint government/private-sector discussion group on the subject, he noted, and the issue is receiving "consistent, but understaffed and underfinanced attention" by the Organization for Economic Cooperation and Development.

Furthermore, the Department of Commerce's National Telecommunications and Information Administration has been devoting an increasing amount of manpower, talent and attention to the area, he

"However, all of this is occurring without any meaningful offical Administration support, without any clear congressional mandate or support and without any agreedupon goals," he charged.

The time has come to correct the situation and give direct support, focus and encouragement to these emerging activies," Goldwater said.

Transborder data flow issues are "directly related to such substantive matters as openness of communications, free flow of information, national security, protection and enhancement of personal informational privacy, interna-tional trade and economic cooperation and, perhaps, the continued ability of the free world to get along and not be divided and conquered," he

# Snow Data Gathered

(Continued from Page 15) center and the other dial-up, are used as control consoles for the computer and for the transmission system, he explained.

Zoerb said the Portland system initially had a very small HP 7900 disk, with 2.5M bytes of memory, to which was added a 15M-byte HP 7905 disk. Both are concurrently on-line to the system, which Zoerb said is "unusual" on an HP system. Because Snotel needed a backup system, and the original disk was too small, the larger disk became the primary one and the smaller one backup, he ex-

The Portland headquarters is connected to the two master stations by means of 1,200 bit/sec full-duplex leased telephone lines, he said. In addition to initiating probes and receiving data, the circuits are used for assigning or reassigning remote stations to one or both master stations for polling responsibility, updating the master station clocks and transferring master polling responsibility in the event of a master station failure.

There are currently nine HP 2640 CRTs accessing the system, in nine of the 10 participating states, Zoerb said. New Mexico has no terminal, but wind speed and direction and has a cooperative agreement other environmental data may with the state of Colorado, which does have one. Other relayed from the noted sites.

states with terminals in the Snotel network are Arizona, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming.

Since the Snotel system is basically for the acquisition of data to be used for a finite period of time, there is not enough room for all the data to be kept at the Portland installation. It is therefore stored on the Department of Agriculture's Univac 1140 at Fort Collins, Colo., for "historic reasons," according to Zoerb.

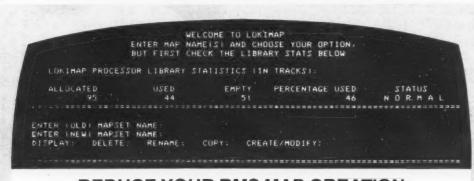
Fort Collins is linked with Portland via dial-up lines, operating synchronously at 2,000 bit/sec. Besides the Portland system, users can access Fort Collins' large data base through their terminals for forecasting programs, regression analysis and correlation analysis, Zoerb said.

Secode Electronics of Dallas manufactured the sensing equipment for the system, and Meteor Communications Consultants of Seattle did the systems engineering and design, according to Zoerb.

Western Union designed and implemented the telemetry system.

A total of 511 remote sensing stations are scheduled for installation by 1981, Zoerb said.

In the future, humidity, be added to the information



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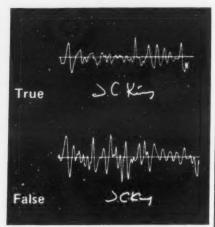
# Experimental System Picks Out Forgeries

YORKTOWN HEIGHTS, N.Y. — An experimental computer-based security system that distinguishes between forged and genuine document signatures has been invented at IBM's Research Division here.

There are no plans to market the "automatic signature verification system" (ASVS), but IBM researchers believe it may be used someday by commercial and governmental organizations in controlling access to sensitive data, devices or locations.

Field trials conducted at an IBM facility indicate the ASVS is the most accurate device of its kind and far more accurate than human document examiners, according to Dr. Noel M. Herbst, one of the system's investors.

Staff members of IBM's Thomas J. Watson Research Center reportedly did their best to fool the equipment



Although these signatures are a close visual match, the patterns of acceleration and pressure exerted by the pen as recorded by the signature verification system while the two signatures were being written are quite different.

during the trials.

According to IBM, the ASVS caught 99.6% of the staffers in the act of forgery (490 out of 492) and accepted 98.3% of the genuine signatures submitted to it (2,907 out of 2,958).

The ASVS does not simulate "reading" of signatures; instead, the system studies pen activity as the document is signed, recording changes in speed, direction and pressure. This information is compared with reference measurements made earlier and stored on an IBM 370.

The pen used in making the signatures is linked to the computer system and contains small accelerometers and a pressure detector that generate the input data.

#### 'Revealing Hesitations'

"Revealing hesitations" and other differences in terms of acceleration and pressure between the input and reference data betray the forger, an IBM spokesman explained.

The special pen is linked in series with an "interface box" that delivers digital data to an IBM System/7, which in turn front ends the 370.

The interface box contains an 8-bit analog-to-digital converter and multiplexer and features three channels of amplification, the spokesman said. The mainframe reportedly stores the ASVS "decision algorithm": about 2,500 lines of PL/I code.

Studies have shown that rapid hand-writing of familiar patterns, such as one's signature, becomes habitual to the extent that the timings of the muscular movements are consistent and beyond deliberate control, Herbst said. The virtually ingrained nature of such muscular coordination is the key to verification in the experimental system.

"The [field trial] results have been so encouraging that a great deal of interest has been voiced in developing [the ASVS] still further and putting it into practical application," Herbst noted.

Possible examples could be control (Continued on Page 18)



An experimental system developed by IBM scientists has detected the difference between forged and genuine signatures in field trials. In those tests, 98.3% of the good signatures were accepted, while 99.6% of the forgeries were rejected.

# Presenting an exciting, new way to develop COBOL programs

When Paul Noll first came to me with his ideas for two books on structured programming, I was skeptical. First, I wasn't sure that structured programming was of any great significance to the programming profession. Second, I had read all of the available literature on the subject, and I wondered what Paul had to say that hadn't already been said.

Now, I'm convinced. Structured programming has the potential to make program development easier and more enjoyable, at the same time that it increases programmer productivity. If it hasn't lived up to this potential, it's because few companies have developed practical methods for applying the theories of structured programming. But that's where Paul comes in.

Paul Noll is one of the top COBOL experts in the country, and he is responsible for the training of more than 150 programmers. During the last few years, he has developed a complete system for implementing the techniques of structured programming. His methods are now available in two books designed for the experienced COBOL programmer.

If you have yet to be introduced to structured techniques, get ready for some exciting reading. And if you are already familiar with these techniques, you'll find Paul's books start where other books and courses leave off. By providing a practical system for implementing the theories of structured programming, these books can improve your methods . . and your results.

#### What these books do

The first book, Structured Programming for the COBOL Programmer, presents a complete system for developing COBOL programs. It includes top-down design, structured module documentation, structured coding, and top-down testing. To use Paul's methods, you won't have to learn a new vocabulary and you won't be overwhelmed by theory. On the contrary, I think you'll be delighted by the straightforward simplicity of Paul's methods.

# 30-day trial and unlimited guarantee

First, take up to 30 days to review the books without paying anything. Second, if these books don't actually change your methods of program development, feel free to return them for a full refund, no matter how long you've had them.

The second book. The Structured Programming Cookbook, is a tool kit for the development of new programs. It gives standards and guidelines for all phases of program development so it becomes an instant standards manual for a structured COBOL shop. In addition, it gives complete design, documentation, and code for four programs that represent the four major classes of business problems. This is intended to cut down the duplication of programming effort. When you develop an update program, for example, I think you'll find that you can use the structure chart, some module documentation, and even some of the COBOL code from the model update program in the cookbook. As you can imagine, this makes programming easier as it increases productivity.

#### How you can use these books

If you use these books for self-study, I think you'll find that you are able to design, document, code and test structured programs in COBOL once you complete the text. If you can't, you can return the books for a full refund, no matter how long you've had them.

If you are in charge of training for your company, I think you'll find that these books represent the most effective course on the new productivity techniques that is currently available at any price. And by using the cookbook after completing the course, I think your programmers will show a marked increase in productivity. As a result, I urge you to try these books with your experienced programmers. And to incorporate these books into your COBOL training for novices.



#### What users think of these books

"Great book! My co-workers won't let me have it back."

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"Well-written, well-organized, simple, and complete. Has everything for the COBOL shop. We are implementing structured COBOL this year and yours are the books."

EDP Manager Seattle, Washington

"Both books have stopped the re-invention of programs and have helped to promote the sharing of code and ideas."

Projects Manager Little Rock, Arkansas

"The first thing I've seen in print that was really useful for the COBOL programmer who wants to write structured code."

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 $\label{eq:DearMike:Please} \textbf{Dear Mike:} \quad Please send me the books I've indicated so I can evaluate Paul's methods for myself. If I don't discover an exciting, new way to develop COBOL programs, I'll return the books for a full refund. I understand I will be billed the appropriate price plus freight (plus sales tax in California).$ 

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	The Structured Programming Cookbook	\$10.00	book ordered (plus 6 percent sales tax if you live in California).
Name and 1	Title		
Company (i	f any)		
Address			
City, State,	Zip		

# Calendar

Oct. 24-25, New York - The Next Five Years in Automated Systems Integration, sponsored by The Yankee Group. Contact: The Yankee Group, Harvard Square, P.O. Box 43, Cambridge, Mass. 02138.

Oct. 30, Chicago - Advanced Systems, Inc.'s 10th Anniversary Professional Training Conference - The State of Personal Privacy in America. Contact: Advanced Systems, Inc.,. 1601 Tonne Road, Elk Grove Village, Ill. 60007

Nov. 6-10, New York - Structured Systems Analysis and Design, sponsored by American Management Assocations (AMA). Contact: AMA, 135 W. 50th St., New York, N.Y. 10020.

Nov. 13-17, New York - Managing and Controling Administrative Operations, sponsored by American Management Associatons (AMA). Contact: AMA, 135 W. 50th St., New York, N.Y. 10020.

Nov. 16-17, San Diego - Computer-Aided Design vs. Specified Energy

# System Catches **Fake Signatures**

(Continued from Page 17) of access to credit or medical information, secure areas, Social Security records and the automatic teller machines at banks," he said.

In an earlier version of the system, patented in 1976 by Herbst and colleague John H. Morrissey, only acceleration data was measured as the signature was written, an IBM spokesman added.

To improve this version, Herbst and two other IBM scientists - Dr. Chao N. Liu and Nicos J. Anthony - added pressure-recording features and refined the decision algorithm by which the signature is evaluated, he said.

The decision algorithm is considered the heart of the ASVS and took more than four years to develop, he continued. This algorithm reportedly compares two signature patterns, while ignoring the gross changes common in signatures, such as missing strokes and stylistic variations.

The field trials involved 248 programmer participants who used the equipment during a five-month period.

Each participant was allowed three attempts to obtain acceptance of a signature. This resulted in the 1.7% rejection of true signatures and .4% acceptances of deliberate forgeries, the spokesman said.

However, the participants were later

allowed to make four more attempts, resulting in a 1.2% rejection of true signatures (35 out of 2,881) and no further acceptance of forgeries.

Standards. Contact: Automated Procedures for Engineering Consultants, Inc., Suite M-15, Grant-Deneau Tower, Dayton, Ohio 45402.

Nov. 20-21, New York - Minicomputers and Small Business Computers: Selection and Usage Guidelines, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J.

Nov. 27-29, Brussels, Belgium - European Communities Symposium on Computer-Aided Design of Digital Electronic Circuits and Systems sponsored by the Commission of the European Communities. Contact: Keness Belgium Congress S.A., Rue de l'Industrie, 17, 1040 Brussels, Belgium. Nov. 27-30, Chicago - Forms De-

sign Course, sponsored by American Management Associations (AMA). Contact: AMA, 135 W. 50th St., New York, N.Y. 10020.

Nov. 28-30, New York - Information Technology and the Office, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 28-30, Toronto - 1978 Canadian Computer Show and Conference. sponsored by the Canadian Information Processing Society (Cips). Contact: Canadian Computer Show, Reg Leckie, show manager, Industrial and Trade Shows of Canada, 36 Butterick Road, Toronto M8W 3Z8, Canada.

Nov. 28-30, New York - International Conference on Data Regulation - European and Third World Realities. sponsored by Online Conferences Ltd. Contact: The Wayne Smith Co., Suite 810, 500 12th St. S.W., Washington, D.C. 20024.

Nov. 29-Dec. 1, San Francisco -Data Base Management Systems: General Concepts and Planning Guidelines, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 29-30, Wellesley, Mass. - Introduction to Data Communications, sponsored by QED Information Sciences, Inc. Contact: Edpep Coordinator, QED Information Sciences, Inc., 141 Linden St., Wellesley, Mass.

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# Three Workshops Set for Fall

# Courses to Cover DP-Related Law Enforcement

SAN JOSE, Calif. — A number of seminars and workshops geared to "real world" criminal justice training needs and DP-related law enforcement techniques will be held from Oct. through Dec. by Theorem Institute, a nonprofit corporation based here.

The first, entitled "Privacy and Security," is an introductory course for criminal justice management and record personnel who must structure criminal records and computerized files according to recent Law Enforcement Assistance Administration (Leaa) regulations. The two-day session is scheduled for Nov. 13-14 in New Orleans and costs \$175 per participant.

"Planning a Productivity System," a

three-day seminar to be held in Washington, D.C., Nov. 28-Dec. 1, will focus on effectiveness and efficiency within modern law enforcement agencies. The registration fee is \$225.

A three-day seminar on "Computer Planning" will be hosted in Phoenix. The course will center on computer implementation and operation; it is designed for the personnel of small and medium-sized law enforcement agencies. The seminar's cost is \$225 per person.

Finally, Theorem will sponsor a three-day course Nov. 8-10 dealing with the evaluation of new ideas, management changes and the concept of planned change. "Strategies for

Change" will take place on the same days in St. Petersburg, Fla., and will cost \$225 for each attendee.

Additional information on the

courses can be obtained from the institute's president, Michael O'Neill, at Suite 590, 1737 N. First St., San Jose, Calif. 95112.

# Intel President to Receive IEEE Award at Compsac '78

SILVER SPRING, Md. — The IEEE Computer Society has selected Dr. Gordon E. Moore, president of Intel Corp., as this year's recipient of the W. Wallace McDowell Award.

The award is presented annually by the society to an individual who has made an outstanding contribution to the computer field in theory, design, practice or education.

Moore, together with Dr. Robert Noyce, founded Intel in 1968. Since that time he has pioneered developments in MOS memory and microprocessors.

The award will be presented to Moore next month at the society's second international Computer Software and Applications Conference (Compsac '78). The conference will be held in Chicago Nov. 14-16 and will cover software development and management; information management systems; computerized decision-making systems; and social, legal and regulatory issues.

Information on the award and the upcoming conference is available from the IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

# 'Capital Budgets' Seminar Topic

TROY, Mich — A seminar on capital budgeting, geared toward corporate financial executives, will be held here Nov. 9.

Rapidata, Inc., a remote computing vendor based in Fairfield, N.J., will sponsor the seminar, which will consist of a morning and afternoon session.

Speaking at the morning session, held from 8:30 a.m. to noon, will be Dr. Michael A. Moses, associate professor of management and corporate strategy at New York University's Graduate School of Business Administration.

Dr. Julian Lange, assistant professor of business administration at Harvard University's Graduate School of Business Administration, will chair the afternoon session.

The enrollment fee for one session is \$75, which includes working materials. For both sessions, the fee is \$125 and includes the full seminar as well as related activities.

The seminar will be held at The Management Education Center of Michigan State University, 811 W. Square Lake Road here in Troy.

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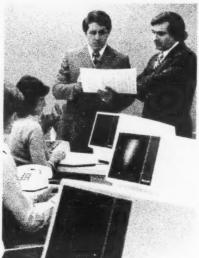
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# Urges More Personalized Service

# Recruiter: Ads Won't Find Minority DPers

By Marguerite Zientara CW Staff

**ANGELES** your company have trouble finding and keeping minority people for middle- and highlevel DP management positions? If it does, and if you are failing to comply with Equal Employment Opportunity Commission laws as a result, it may be wise to consider a different method of minority personnel recruitment, according to a personnel recruiter here.

Tom Rideout, a partner in Human Resource Systems, thinks the popular newspaper ad is a particularly ineffective means of filling personnel needs. If one looks through newspaper want ads, he noted, one sees a large number of black faces depicted in the ads, with the black DP manager in particularly hot demand.

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That demand, however, is not being met by many companies using their present recruiting techniques, Rideout

"All newspaper ads do is generate a lot of resumes," he added. "I'm more interested in finding one good man or woman than in having 10 re-

Rideout - who, along with his partner, is black - cited three reasons why newspaper advertising is not the best vehicle for a personnel search. First, he said, all the ads are basically the same, promising a great career" but not disclosing any salary information. An applicant might be wasting his time because he has no idea whether his salary requirements are too high or too low, Rideout said.

Second, in a "blind" ad, the applicant risks applying to his own company unknowingly.

Third, according to Rideout, applicants like to be represented by an agent who can provide answers to their questions before they express in-

entire DP community.

The program "does not reflect the views of Honeywell alone, but brings into perspective the varied views of national as well as international experts in the field of computer security and privacy," a Honeywell spokesman said.

The proceedings cost \$25; a limited number of last year's proceedings are also available at the same price.

Orders can be sent to Jerome Lobel, manager of the Computer Security and Privacy Education Program, at P.O. Box 6000 (Mail Stop T99), Phoenix, Ariz. 85005.

minorities in the systems area: "Black and other minority professionals do not have enough prototypes at the top of major corporations as inducements for them to go work for those companies,"
Minority applicants "are

well aware of Affirmative Action and all its ramifications, and they know they're very desirable, but what can they feel their ultimate career potential is when they walk into a company and at the top it's all lily white?" Rideout asked.

Secondly, a company cannot hope to keep its minority employees if the company brings someone in, puts him to work and just leaves him in that job, Rideout said. In a firm like that, the chances for advancement are no better than they were 10 years ago for minorities, he said.

Another reason why newspaper advertisements are ineffective, according to Rideout, is that minorities, by virtue of being security-oriented, are not mobile. "A minority member with five years' experience at one company will be hesitant to move to another company whose philosophy and attitude toward employees are unknown to him," Rideout pointed out.

#### **Personalized Process**

In a process that Rideout termed more personalized and therefore more successful, Human Resource Systems contacts companies likely to have a demand for minorities, determines its actual demand and then finds the type of people whose career objectives fit the client companies' de-

Through various sources, Rideout gets the names of currently employed minority people, calls them up and outlines the opportunities he has. His sources include friends, previously recruited minority members, DP industry members and minority professional societies.

Since 70% of all upper level management positions are created for the applicant, Rideout said, "we expose companies to qualified individuals who are in a position to create their own demand and posi-

Rideout's firm charges a fee from the businesses involved on a contract basis. "The clients pay us to go out and find these people they can't find themselves," he said.

It can take anywhere from 30 to 90 days to find a suitable applicant for a company's particular needs, Rideout said, because 11 or 12 people must be screened to find the one or two who fit a company's needs.

Human Resource Systems tries to submit to each client company no less than three qualified applicants for each position. Within one recent week, it recruited seven male minority members with five to 11 years' experience each in the systems area.



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# Afips Shifting Into First Gear on NCC Plans

MONTVALE, N.J. - Although the annual National Computer Conference (NCC) is still more than eight months away, the American Federation of Information Processing Societies, Inc. (Afips), the show's sponsor, has already shifted plans into first

The 1979 NCC, a four-day extravaganza of seminars, workshops and equipment, is scheduled to take place in New York City June 4-7.

Jerry L. Koory, vice-president and director of the Title Services Division of HW Systems, Inc., was recently appointed chairman of this year's NCC administrative committee, according to an Afips spokesman.

The NCC committee is responsible for providing administrative support and guidance to the yearly conference. It also monitors each show's content and quality and assists the NCC board in planning policy functions.

Koory has been a member of the NCC committee since 1970 and was previously a committee chairman from 1971 to 1972. In addition, he is a former chairman of the Congress Guidelines Committee of the International Federation for Information Processing and has served as treasurer, vicechairman and chairman of the San Fernando Valley, Calif., chapter of the Association for Computing Machinery (ACM)

#### **Personal Computing Festival**

Richard A. Kuzmack, a senior economist with the Mathtech Division of Mathematica, Inc., has been named chairman of the Personal Computing Festival which will run concurrently with the NCC show.

The festival will feature technical program sessions on the microcomputer field as well as application demon-

# Calendar Covers D.C. Hearings

WASHINGTON, D.C. American Federation of Information Processing Societies, Inc.'s (Afips) chapter is offering a free weekly calendar of information policy-related hearings in the legislative and executive branches of government.

The publication is compiled from a variety of sources, a spokesman noted, and can be obtained from Afips' Bureau, Suite 805, 1815 N. Lynn St., Arlington, Va. 22209.

#### Witness Statement Exchange

In addition, the Afips Washington office is initiating a Witness Statement Exchange that will provide a means of exchanging recent witness statements made before the legislative and executive branches on information policy is-

To participate in the exchange, one recent witness statement concerning information policy should be sent to Pender M. McCarter, a research associate at the Washington office. after, specific witness statement requests can be made by mail.

For each requested witness statement. the spokesman explained, one statement should be included in exchange. The request should, of course, be accompanied by a stamped, selfaddressed envelope.

strations and exhibits, the spokesman noted.

Recently, Kuzmack participated in the formation of the Personal Computing Society, a national organization dedicated to facilitating noncommercial applications of computer technology. He is also a member of the society's board of directors, the spokesman pointed out.

Kuzmack chaired the first national Computer Club Congress, held in conjunction with the 1977 NCC, assisted in the organization and operation of program sessions at NCC '78 and helped to organize the Chesapeake Microcomputer Club - a Baltimore/-Washington group of computer hob-

Also an ACM member, Kuzmack is

involved with its Special Interest Group on Personal Computing (Sig

Afips is a federation of 14 nonprofit scientific, educational and professional societies representing approximately 120,000 individuals concerned with computers and their applications.

The NCC is considered the largest gathering of the computing and information processing community and features a variety of DP-related sessions as well as an extensive exhibition of DP products and services, the spokesman said.

Information on the 1979 NCC and the Personal Computing Festival is available from the society's headquarters at 210 Summit Ave., Montvale, N.I. 07645.



Richard Kuzmack

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# **Editorial**

# Back in the Saddle

In one fell swoop, IBM has regained its image as a leader in computing technology, an image that had been slipping a little lately.

With the announcement of the 8100 computer system — and the first system use of 64K-bit chips — IBM has clearly stolen some of the thunder from the more go-go mini makers and semiconductor houses.

However, the same announcement [CW, Oct. 9] held some bad news for users: All of the 8100's operating system software is unbundled. This means users will have to pay for software they previously received along with the hardware.

Like all dark clouds, however, this one may have a silver lining.

The separate charges for operating system software on the 8100 — and similar announcements along the same line expected in the future — will draw more competition into this area.

This increased competition should serve to lower prices for users who are willing to shop around and try third-party operating systems—just as the increased competition in the plug-compatible peripherals and mainframe sectors have served to spur lower prices in those areas.

And, in reality, IBM's software has never been "free"; its price has just been hidden from the users since it was part of the price of the hardware. Users paid for all of the operating system's bells and whistles even if they did not take advantage of all of them. In the new world of separate charges, users should be able to tailor the operating systems software to their needs better than they have in the past.

Only time will tell whether these potential user advantages will become reality, but it seems likely that there will now be more sources of operating systems than in the past and that users will have to spend more time in evaluating software—but the benefits may be large.

On the technology side, the long lead time — more than a year — for delivery of 8100s using the 64K-bit chip may give the mini makers and semiconductor houses a chance to catch up with IBM.

In the world of minicomputers, systems are rarely announced so far in advance of deliveries. In the next year or year and a half before the 8100 is delivered in volume, it is likely some of the mini firms will have systems available using similar — and perhaps superior — chips.

For now, however, IBM has certainly stolen the thunder from these companies — and if it actually delivers systems with the new chip on time, it will have technologically leapfrogged the rest of the industry.



# Letters to the Editor

# **Compensation From Mess**

The cost of the bigger Zip Code [CW, Oct. 2] that must be borne by almost all organizations using data processing obviously will be a huge one. Equally obviously, the big Zip will come in.

Let us, however, try to obtain a few quid pro quos. Let the large users, the vendors and the DP associations start to lobby now for:

1. Allowing the big Zip to replace city and state on addresses.

2. Requiring that all government organizations (federal, state, county and city) which request geographical statistics use the Zip Code — not state or county or whatever — as the key element.

We will have to comply; but let's try to get some compensation from the mess.

D.S. Owings

Brooklyn, N.Y.

# Situation Sounds Familiar

Three cheers for Miles Benson for his "Lying to Management" [CW, Sept. 11]. He described a situation that must be familiar to many of us.

William J. Denholm III

Mountain View, Calif.

### Unfair to Dijkstra

"DOD Expects Standard Compiler by 1981" [CW, Oct. 2] was unfair in its treatment of Prof. Dijkstra's criticism of the "Ironman" project. Prof. Dijkstra certainly needs no help in defending his position; he is capable of doing that himself. However, I, as well as many others in the software design business, had similar reactions to the "Ironman" report.

If the publication was indeed the "Ironman" version (i.e., proceeded by much preliminary research and publication, to include "Strawman," "Tinman," etc.), then Dijkstra is indeed justified in his strong criticism.

The "Ironman" publication exhibits most of the mistakes made in many previous language design efforts. One only need read a good example of a language manual, the Algol 60 Report or the Pascal Report, to realize the obvious shortcomings of the "Ironman" report. Mistakes have been made in the past, but the authors of the "Ironman" report paid very little attention to them.

I hope Computerworld will give Prof. Dijkstra space in which to defend his attack on the DOD effort. Past and present mistakes should certaily be brought to light before the U.S. taxpayer is asked to finance yet another disaster.

William J. Holst

Stamford, Conn.

# Tapes Available Too

I read with interest the notice in the Sept. 4 issue of *Computerworld* concerning the Internal Revenue Service's (IRS) Statistics of Income publications.

Readers might be interested to know that the IRS also makes available, through this office, the publicly releasable data tapes on which these publications are based. The tapes have been processed to protect the identity of all individuals and corporations. Currently tapes are available for individuals for 1966 through 1975 and for corporations for 1965 through 1974 (1975 should be ready soon).

This office also makes available the data tapes of a growing number of other federal government agencies. A Catalog of Machine-Readable Records in the National Archives of the United States is available free of charge. Interested people should contact the Machine-Readable Archives Division, National Archives and Record Service, Washington, D.C. 20408.

Charles Gellert Archivist

General Services Administration Washington, D.C.

# **Data Past**

# Five Years Ago Oct. 17, 1973

WASHINGTON, D.C. - A bill calling for a federal privacy board to protect individuals against "improper, incorrect or unauthorized compilation or dissemination of information" from computerized data banks was introduced in Congress by 27 members of the House of Representatives. The bill applied to all data banks - state and local government as well as private - and was considered a companion to the Federal Privacy Act introduced by Rep. Edward Koch (D-N.Y.) that would require federal agencies to reveal the existence of data banks to affected citizens.

TULSA, Okla. — Judge A. Sherman Christensen admitted his computation of antitrust damages against IBM in the Telex case against the firm "involved substantial error." In the unusual move, Christensen said he would grant IBM a motion either to amend the finding he issued in the Telex-IBM

case or else grant IBM a new trial on the issue of damages.

#### Eight Years Ago Oct. 21, 1970

WASHINGTON, D.C. — In an unprecedented response to the Federal Communications Commission, more than 100 organizations went on record as favoring the establishment of competitive data communications facilities by specialized common carriers. Of 110 responses submitted, 105 favored the establishment of the new carriers.

WASHINGTON, D.C. — A computerized court case ranking system, designed by the U.S. Attorney's Office, was showing signs of favoring the guilty and forcing the "innocent" to wait for trial. The system was found to rank cases according to importance: serious crimes were ranked high, minor crimes were ranked low on the scale. Because of overcrowding of the court system, low-ranked cases were more likely to be postponed and innocent defendants kept in jail.



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# The Human Connection

# Costs Rise, Benefits Soar for On-Line User

Special to CW

It was almost two years ago that I first interviewed Bob Currie for this column [CW, Dec. 20, 1976]. He was then director of evaluation for the domestic programs of Action, the U.S. federal government agency responsible for coordinating volunteer social services programs worldwide.

The column dealt with the discouraging experiences his group endured while trying to get its computer center people to develop statistical analysis programs. It ended on the note that the group was forced to go to a local service bureau to get decent support, shortly after which the in-house machine operations of the center were discontinued.

Well, I heard that Bob recently changed jobs within the agency, so I thought it might be interesting and timely to interview him again and report on the DP progress achieved during his tenure. Here's what he had to say:

Most of us grew up in the social program area with almost no background or experience in DP. Yet the

service bureau people greeted us with open arms. Let me describe how we operated before we moved onto the bureau's machine and then how we got to where we are today.

The original procedure was for our evaluator to specify the general type of analysis to be applied to our master data bases for the purposes of an evaluation report.

The data bases contained information on volunteers and project histories. This need was passed to one of our statisticians, who selected or wrote an algorithm. Then this person, in turn, brought the problem to the programmer in the agency's computer center.

When the programmer had time for us - which was rare because we were the low man on the user totem pole - the algorithm would be coded up and run against the data

#### **Turnaround Troubles**

Well, it doesn't take much imagination to see the problems we had in turnaround. And the frustration levels ran high since we just never felt we were obtaining proper serv-

First, the service vendor provided us with a package of statistical programs, SPSS, expressly designed for the social sciences. By using this software in conjunction with our master data bases, we eliminated the need for the programmer. We were amazed to find out that we could achieve just a few hours' turnaround for any of our jobs, which, of course, we ran in the batch mode.

Then, as we came to know the procedures for using the software, we reassigned the statistical specialist to more creative work. So at this point, the evaluator was able to design his own evaluation strategy, invoke the proper statistical routine and execute his job without further assistance from computer center personnel.

The next step was to install a terminal for the purpose of submitting jobs on a remote-batch basis, which turned out to be comparably priced to messenger service and much more convenient. But this method soon gave way to the use of the terminal in the interactive mode, when the vendor supplied us with an on-line version of SPSS, called

The device we're currently using is a combination word processor and terminal. It allows us to store results from processing on a magnetic medium. Now the evaluator uses the machine in wordprocessing mode to select the proper level of output and to structure a narrative report in a usable format. This strategy allowed us to cut down the time for report pro-

If I were to sum it all up, I'd say 'What a change!.' Our problem used to be too little information far too late; now our problem is too much information too quickly. The evaluators have become so productive that we must now learn how to summarize effectively so that our management can use the information

Sure, our costs for DP have really increased during recent years, but now we are really proud of the job we're doing.

Next week, Currie discusses the impact of the outside operation on the DP department and top management of the agency.

# The Taylor Report

# Some User-Vendor Rows **Best Settled in Court**

By Alan Taylor

Special to CW

Recently, Dick Brandon, president of Brandon Consulting Group, Inc. in New York City, wrote that he would take his hat off to NCR Corp. for requiring arbitration while IBM steadfastly opposes it [CW, Aug. 14]. He thought the NCR clause I quoted in my column [CW, July 31] was "perfectly normal" and one he would "gladly accept as a user representative in negotiation." Furthermore, he thinks arbitration will produce better informed decision makers.

If this is so, I assume he hasn't recently faced the consequences of such clauses or discovered how they destroy the few legal rights the user has when he accepts a vendor-written contract.

More than once, I have had to face such problems; my comments come from experience. After reading Brandon, I still say "thumbs down" on arbitration.

#### **Point of Contention**

First of all. Brandon thinks the NCR arbitration clause is "perfectly normal, acceptable," while I think it is too stringent. A standard arbitration clause, recommended by the American Arbitration Association, would not force so much into arbitration. It would only cover the precise contract in which the clause appeared and would leave open all other matters, for ordinary legal

By contrast, the NCR arbitration cluse covers all supplies withor contract and all contract dispu's - in fact, all relationships Jetween the two firms.

In point of fact, the NCR clause could effectively be translated as follows:

Any controversy arising out of any contract, of or out of the furnishing of any equipment or service to a customer, whether or not under this agreement, shall be settled by arbitration, and not by the courts.

Doesn't such a clause force too many matters under arbitration?

#### **Better Decision-Making?**

Brandon's second point was that the process of arbitration allows for more expert decision-making since judges don't know computers. With all due respect to judges, Brandon has something

But can computer knowledge even when allied with business experience substitute for knowledge of the law?

Most computer contracts forced on users by vendors contain very tricky language and require an understanding of law — even more than an understanding of computers - if the weaker party is to obtain the little that is offered. To illustrate this point, let us examine the very contract Brandon raved about, the NCR

(Continued on Page 28)

# Reader Commentary

# **Cybernetics Struggling** With Practical Problems

By Victor Glushkov

Novosti Press Agency

So far "intelligence" tests for machines that may one day take over most of the brain's functions must be the same as for man; we cannot expect too much. We do not promise to build an artificial intellect brilliant in all respects by the end of the century; however, there are thousands of people who are neither a Tolstoy, nor a Pushkin, but are extremely important and valuable for society.

In the future the machine will, of course, be more "quickwitted" than man. The human brain consists of some 14 billion neurons, devised in a very spendthrift manner.

In order to fully imitate our brain, scientists will require fewcomputer cells neurons, but an enormous gain in speed. A living neuron performs 30 or — at best — 50 operations per second, while a computer element can handle more than 100 million operations per second.

For this reason, it is possible that, some time in the future, a brilliant machine intellect will be built which will excel the human one in any field of endeavor But when this will happen can only be guessed at this stage.

#### Really Necessary?

The question arises, do we really need artificial intellect comparable to our own? In the development of technology, man

solves only the most practical problems. Why create a machine capable of turning out 10,000 novels a year or producing in mass editions such perfect works of art as Leonardo da Vinci's "Mona Lisa" or Botticelli's "Primavera"?

The value of each would be reduced, making it not worth the

I think that cybernetics will develop according to classical formula, "The demand determines the supply." Today industry needs robots orienting themselves freely in space and able to understand and carry out vocal commands. Since this problem arises in our practical activity, it will be solved.

Rivalry between man and machine is not our aim. The USSR is presently devoting much attention to mass-producing robots to work in factories. Computers are best used to free man from the enormous number of routine operations with which any type of his creative work is unthinkable, to reinforce his intellect and to rid him of most mechanical

# Fear of 'Breaking Loose'

But if man does succeed in creating an intelligent machine, some people say, it may be that the robot will try to "break loose." I absolutely disagree with Norbert Wiener, the father of cybernetics, on this question.

(Continued on Page 26)

# DPers Must Learn Users' Decision Criteria

By Jim Ryan

Special to CW

When a computer systems engineer quotes accuracy figures on his system, error rates as one in a million are freely tossed about. On the other hand, a student with a score of 95% is rated in the excellent category, when in fact the error rate is five parts in a hundred.

The difference between these two standards is, in my opinion, the cause of much of the confusion between the computer industry and the public, the ultimate users of

computers.

Unfortunately, the cause of this confusion can be traced directly to DP people themselves in their overzealous claims about systems' accu-

these claims by stressing the fact that all computers are basically only tools to be used by people and are only as good as the people using

racy. They often fail to qualify relative accuracy of their computer printouts. Real computer errors usually can be spotted immediately, because they do not fit into the basic flow of information or statis-

racy of the input information. Even in the field of mathematics, the user has an order-of-magnitude result in mind when the printout is received.

Generally, however, DPers frown on users who insist on making what they believe to be "seat-of-thepants" decisions. The concept of questioning computer printouts if they do not agree with intuitive answers is not accepted by DPers, but a successful executive's seat-of-thepants conclusion is really often the sum of many years of intellectual experience in a particular field applied to a specific problem.

who must determine what use is to

be made of the output documents,

based on his knowledge of the accu-

If the printout does not agree with the preconceived estimated answer, the true executive is usually willing to make further tests to arrive at a considered judgment.

# Reader Commentary

them.

Because of the excess emphasis on hardware accuracy and the lack of emphasis on people, DPers are being charged with constantly increasing numbers of failures because so many daily activities now involve computers.

In the actual case, competent computer users are always aware of the

tics when the report is reviewed as a total document.

#### **Subtle Situation**

It is the more subtle situation, caused by errors or deliberate distortions in the input documents, that makes the printout more or less valuable to the user.

In the final analysis, it is the user

#### In Direct Opposition

In direct opposition to this philosophy, there are many people who have managed to have successful careers without ever making a decision for which they can be held accountable. These people spend thousands of dollars gathering information, then develop elaborate codes, filing systems and DP systems with extensive hardware to match, all of which is used to obtain voluminous printouts which are published with great fanfare.

The result is many contradictory reports issued from supposedly highly qualified sources. They all have one thing in common: they are published without considered judgment on the part of the author. This is often done deliberately because it does not leave the author open for criticism; supposedly, the DP-based decision is final.

It also allows the user to avoid serious thinking, which in turn makes it increasingly difficult for reasonable people to study a problem, arrive at a mutually satisfactory solution which can be accepted by another group of equally responsible people. The computer has contributed its share to the unusually self-centered attitudes of many groups today.

#### **Discussions With Users**

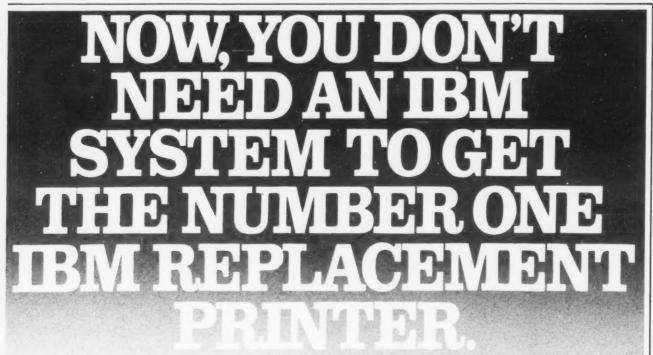
DPers can help reduce this confusion if they have the courage to at least discuss with the user the true value of printouts as they relate to the problem being considered. To do this, however, DPers will have to become aware of the many factors other than computer printouts which go into making decisions.

The alternative is to be identified as the machine operator who produces information based on the input received without using any judgment other than that required to produce the most efficient and most economical computer results.

This alternative is not really acceptable because computers are too intimately associated with people in contrast to other types of machinproducts.

For example, the typewriter is nothing but a mechanical means of conveying information; it cannot add to or detract from the information typed in. The computer, on the

(Continued on Page 25)



Decision Data announces its 6600 Series of line printers (300, 450, 600, 900, and 1500 lpm) is now available through lease or purchase for use with DEC's PDP-8, PDP-11, and LSI-11; Data General's Nova and Eclipse; Hewlett Packard's 2100 and 21MX; Univac's BC/7 and UTS 700; and Interdata systems.

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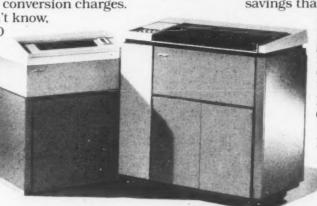
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makes computing cost less

# And Then Take Responsibility for Output

(Continued from Page 24)

other hand, can, with suitable software and carefully selected input, be made to produce an output which is completely biased in favor of a particular position, with the user's original thoughts being lost in the output.

Because computers are now such an important part of everyday life, it is becoming a growing responsibility of DPers to become intimately involved with the truth of their printouts if only to protect themselves.

#### 'Breakage' Concept

Just so that this will not appear to be too theoretical, let's move the discussion into the purely statistical side of the computer field. Probably the most obvious subject is inventory control. Here we become familiar with the concept of "breakage," which is the difference between the records and the actual inventory taken at any time when the records and the physical plant are temporarily frozen to eliminate the time factor in a comparison study.

Prior to DP systems, it was a commonly accepted practice to manually reconcile the difference between the physical inventory and the records. It was often a harrowing experience, but since volumes were relatively small and all records were physically available in easily understood form, it was usually possible to reconcile the differences, bring the breakage down to an acceptable level and charge it to specific elements.

Because of high volumes and because mechanized records are now being input by many people who are not part of responsible management but who are simply doing specific narrow functions, the input error rate — and in some cases the deliberate falsification of input information - has caused the breakage level to be increased substantially.

In many cases, the situation has deteriorated to the point where an acceptable breakage level has been determined and is simply charged to the cost of doing business. The ultimate cost is charged to the customer, in the form of higher prices. As long as this does not result in pricing the company out of business, all is well.

Under these conditions, if all companies are equally in difficulty, the breakage point can be quite high and remain acceptable. There

'It's Something New ... A Glitch" Strip.

prove that there is now a high breakage level, if the number of identified white collar crimes is any criterion.

#### **Reasonable Explanations**

To counteract this condition, perhaps it might be possible for the DP industry to do what other industries have done with some degree of success. It can develop a program that will automatically break down the total breakage into hardware and software errors, human errors and deliberate civil or criminal fal-

The general public is conditioned to reasonable explanations of even criminal acts; what people do not

seems to be ample evidence to like is voluminous documentation which either proves that the error was not the author's fault or smothers the problem so that the reader is totally frustrated.

What is needed is a computeroriented program that emulates the manual process followed during an audit of any industry. A true audit must include all entry information as well as software and hardware features of any system. The hardware features have been amply covered by many types of testing equipment using sophisticated diagnostic testing procedures.

The problem is to develop computer programs that will check and verify software and user input with the same tolerance levels now used

in hardware diagnostics. This can only be done by using auditing techniques that involve a separate method and a considerable amount of cross-checking.

For this type of operation, modern "hand-shaking" procedures are available at a reasonable cost. It seems the DP industry is now sophisticated enough to be able to develop computers to check other computer systems from user input to final output.

If computer usage continues to expand at its present rate and white collar errors or deliberate falsifications expand equally rapidly, the computer industry may be forced to develop countermeasures to sur-

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# **USSR** Grappling With Cybernetics Issues

(Continued from Page 23)

Wiener suggests that the more sophisticated the machine and the more unpredictable its behavior, the greater is the probability of its refusing to act as it is bid. The theory of reliability of technical means has long since proved that whatever the machine's degree of complexity may be, there exist purely mechanical means by which any required level of reliability may be ensured.

The most interesting and promising work we are doing at the USSR Institute of Cybernetics appears to be an automatic system capable of proving mathematical theorems. We have set for ourselves the task of designing a machine which would amplify the abilities of the mathematician and would help him.

The MIR series which we created not only makes computations, but can also deduce formulas - for example, Newton's binomial. Using the electronic computer, this and many other formulas may be deduced quickly and simply, because the computer's operating speed is significantly higher than that of the average mathematician.

#### **Spontaneous Reasoning**

Now there is talk of logical reasoning of a spontaneous nature. Here, too, a great deal has already been achieved. A fundamentally new approach has been found, a special new language which enables man and machine to communicate.

There is now a set of algorithms that enables the computer to make logical deductions given a certain set of facts. Elements capable of handling this sort of knowledge have been created and will soon be introduced into computers.

In the laboratories of our institute, we have a second-generation robot with eyesight, hearing and a voice. What is more, the voice is not just human speech recorded on a magnetic tape. The machine itself constructs sounds, picks up objects and moves them in space and builds structures from bricks.

We are also working on the identification of images. How is one object to be distinguished from another, a man's face from a woman's? If machines could learn to do this, it would mean fantastic possibilities for the national economy

Essentially, nearly all the prob-lems of artificial intellect boil down to the maximum reduction of excess variants. To instantly recognize an object, idea or image and see it against the background of others, rejecting all the rest, is the hitch.

The creation of an organ of vision is equivalent to the human eye in what it perceives is so far just a dream, and we think that it cannot be done until the end of this century

The institute has concentrated on problems relating to the training of machines. There are special pro-

grams of instruction, for instance in chess, where not merely an algorithm of chess but an initial knowledge in this field and the ability to learn more are programmed into the machine. This is an alrorithm with narrow specialization.

In a particular field we can produce an algorithm which will enable the machine to learn more quickly than even the most brilliant person. But this can be done in only one narrow field, whereas simultaneous learning in a broad spectrum of fields has not as yet been achieved.

Toward the end of the century and even earlier, we expect to have fully automatic engineering and building plants in which robots will replace people in all complex and labor-consuming operations; on assembly lines and working with machine tools.

Glushkov is director of the Institute of Cybernetics at the USSR's Academy of Sciences, Ukranian branch.

# Letters to the Editor

# In Search of Answer

I am a student in data processing at Indiana Technical Vocational College and am researching the question of why most printouts are on green-and-white striped paper. Not white without stripes, not soft yellow or pastel blue, but white and green. Frankly, I suspect I have been given this assignment because the instructors have not bothered to ask the tradesmen. Any answers? Eugene Hutchen

Gary, Ind.

# **Inappropriate Slanting**

"Pentagon Split on Effectiveness Renton, Wash.

of Crisis Aid" [CW, Aug. 14] was, in my estimation, much more suitable for a publication such as the National Enquirer. The headline and the first two paragraphs were written in a style that would do a National Enquirer reporter proud.

I am disappointed. In a publication such as Computerworld, I expect articles to be written in a professional manner. Facts should be presented, not statements such as WWMCCS "does not work." Such a statement is not supported by the rest of the article, nor does quoting "news reports" make it any more valid.

Bruce E. Andrews

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# Agenda

Morning-For Operators Introduction

- -Overview of Monitoring Methods
- -Background versus real-time monitoring
- -Problems with real-time monitoring
- -OMEGAMON approach to monitoring
- OMEGAMON Exception Analysis
- -Why jobs are waiting
- -Monitoring TSO response problems
- -Catching looping jobs and TSO users
- -Reasons for console lockouts
- -Explanation of enqueues and reserves
- -Hardware problems

- - Afternoon—for Systems Programmers NEW PRODUCT ANNOUNCEMENT—EPILOG
  - (See Page 31 October 16 issue of Computerworld)
  - -Monitoring disks: reserves, head movement, dropped ready
  - -Introduction to SRM (changes with MVS/SE)
  - -Case histories of MVS monitoring
  - experiences

Please register me for: A14 Morning Session \_\_

Afternoon \_ Title\_ Address .

Company\_ Day . State.

Number attending. \_ Phone ( Zip\_

# And Farley Harthwait Knew It

# 'One Step at a Time' the Route to Insanity

By Miles Benson

Special to CW the soft-

ware embedded Sociology in a sys-Computing tem of even

more complexity, where fitting all the schedule pieces together is just as complicated as fitting all the technology pieces together?

"One step at a time" is the answer at Wings Aloft Avaiation. But "one step at a time" has a very special meaning.

It's that special meaning that rankled Farley Harthwait. Farley, once a real-time programmer in Wings Aloft's avionics softdepartment, ware fiercely independent, sharp as a trailing-edge technologist who had a hard time fitting into the Wings Aloft mold.

"One step at a time," at Wings Aloft, means breaking a large task down into small work packages, and scheduling each package, and never deviating from that schedule. It's the last item in the list that bugged Farley.

Here's how it works. Let's suppose Wings Aloft is building the avionics system for a new fighter plane, the F-21. That system might include an airborne computer, interfaces to sensors for such things as navigational and radar hardware and the software necessary to support all that.

Typically, the software might break down into an executive program, application systems for the navigation and other external interfaces, some glue and spit polish to hold the whole thing together and maybe even support software, such compilers and assemblers and loaders, to aid in the construction of the applications.

Now, break that package down, "one step at a time." Perhaps there's an exec task, and a set of applications tasks, and a glue-andspit-polish task and a support software task.

Done? No, not yet. Because each of those tasks must also be done "one step at a time." Define require-Integrate. Acceptance-test. Deliver. The work pages get hurting the follow-on ones. down to "wrap your arms around it" size.

Now, picture the performance of those tasks. They're all laid out neatly on a for its long-term impact.

tick marks for each mile-How do you manage a stone. And managers who large, complex software im- care very much about each plementation? One where of those tick marks. "Too much," Faley says.

You know how schedules They're educated guesses on how the job might turn out. If all goes well.

Well, that's true at Wings Aloft, too, of course ... except that it's not true. Because of the complexity of the total system, concrete Holy Water are sprinkled on those schedules. The result is predictable. The schedules, guesstimates though they may be, aren't allowed to flex.

# Right Job, Wrong Schedule

Let's get down to cases. Farley was responsible for the Nav package on the F-21. And he nearly went out of his tree.

You see, he got behind schedule on the coding task. and the reason he got behind schedule is that he got ahead of schedule on his integration task.

Farley realized, halfway into coding, that until he was sure of his interfaces, there was no point in proceeding. Undoing bad code is harder than starting from scratch on good code, right?

So Farley began testing his interfaces using a rudimentary version of his Nav code to see if he was on the right

here's the rub. Now. Farley's manager was disturbed about his schedule slide. Frantic, you might even sav.

The manager gets scored primarily on cost and schedule performance, you see. Being off-schedule is like building the wrong product to a technologist. The words reserved for an off-schedule manager at Wings Aloft are decidely unkind.

Are you beginning to understand Farley's dilemma? He was doing his job right. It was the schedule that was

# The Bigger Picture

Let's back off a hundred meters or so and look at the bigger picture. If Farley did what his manager wanted, and went by the schedule, he would be throwing an element of risk into the longer term schedule. Satisfying ments. Design. Code, Test. the near-term schedule in all probability would mean

> And the same system that rewarded Farley for his short-term performance would surely punish him

earlier that, although they don't seem to realize it. schedule slavishness bugs others at Wings Aloft as well as Farley? Now you can begin to see why. A crisis attitude is spawned early in each project by imperfectly conceived sched-The crisis never abates.

After considerable soulsearching, Farley finally realized that his sanity demanded that the technical needs of the task overrode the schedule needs. "My manager be damned," he thought to himself. "Someone has to do the job right, even if no one wants me to."

Well, Farley's stay in the Wings Aloft mold was both uncomfortable and short. Management wasn't interested in schedule-deviant behavior, they told Farley. When he declined to concentrate on his coding tick mark and defer his integration, he was marked for departure.

When the F-21 project task was all through, so was Far-

This isn't a sad story, though. Farley quickly picked up a job at Clickety-Clack and Western Railway, doing transportation system simulations. They appreciate Farley's independent spirit and sharp mind there.

They still do things "one step at a time," of course. But to a realistic schedule, malleable when added ley feels right at home.

He may have planted a small seed of sanity back at Wings Aloft, however. The managers there, although they're sure they did the right thing in laying him off, are scratching their heads over one question.

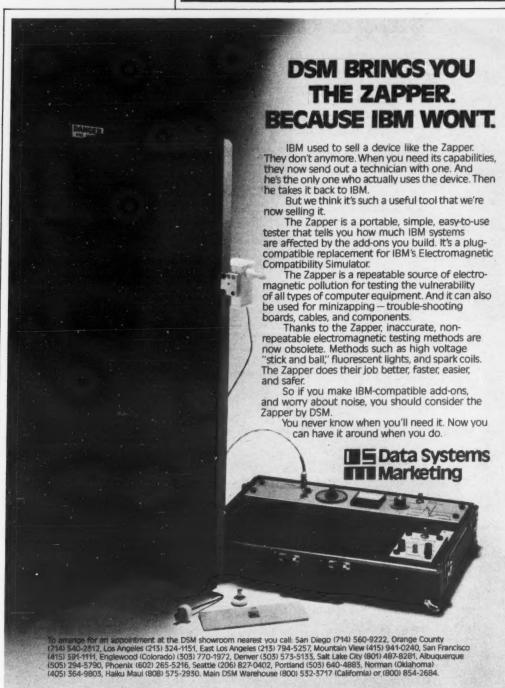
"How can a guy miss nearly all of his mile-stones," they muse collec-tively, "and still be ahead of schedule on his final delivery?" Maybe some day they'll figure it out.

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# Advice to Women Moving Up: Be Yourself

By Aretta J. Evans Special to CW

I have read two articles by Donnamarie White [CW, June 19 and July 31] and a couple of letters from angry women in the DP field. Although these letters expressed the readers' irritation, they did not suggest an alternate pattern of dress and behavior. I wish to comment on White's set of arbitrary standards.

As far as clothes are concerned, I think neat, attractive clothes in most any style are acceptable. Common sense will tell most women what's appropriate in a business environment.

Do your job the best way you can and, if your supervisor one day happens to say, "Good job," don't

make the mistake of telling him it to move up the ladder. was nothing — he'll believe you. Instead, take the opportunity to tell

# Reader Commentary

him about a new technique or routine you're using

Behavior should be natural. Trying to force yourself to act selfconfident and self-assured would be disastrous. Your supervisors might see through the farce and think you are a phony. Besides, if you aren't self-confident in your present position, you aren't ready

If you happen to be a bit different eccentric, some people call it don't be afraid to let yourself shine. Some of the most successful people I know are considered nonconformists. Top management might be looking for new ideas and talents.

My last point, I think, is extremely important. Although the company president may admire a trait in one

person, he may find the same feature catastrophic in another person.

For heaven's sake, do not emulate anyone. If I'm going to lose or win a position, I must be judged on my own faults or merits.

I respect White's opinion. Her system for getting to the top worked for her, but I don't think there is any set of rules that can ensure a woman will "make it."

# Settle Disputes in Court

(Continued from Page 23) contract for its Criterion systems. Criterion CPUs do not, in themselves, have a machine code users can implement. "Firmware" pro-

vided by NCR makes the system work; without it, the system is valueless.

Let us consider a hypothetical sales agreement between a user and NCR for the purchase of a \$100,000 Criterion. What has the user bought? Does he own a working machine?

Problems arise when one reads the 10th paragraph of the universal agreement in the NCR contract entitled, "Ownership of Software and Confidentiality." NCR slips in the point that it will maintain ownership of the "firmware," defined here as programs.

Most people would not think NCR's ownership of programs could result in their computers becoming nonoperational. But the agreement also stipulates that all programs provided by NCR shall be and remain its property, despite any sale.

So, what can the user sell? What does he own? As far as I can see, a Criterion buyer who has signed one of these arbitration clauses is apparently paying for an unusable piece of ironmongery and is completely dependent on NCR's goodwill to make it of any value.

As for reselling a Criterion, look at the way Honeywell, Inc. destroyed the second-user value of its computers by reinterpreting their duties. We have no reason to believe NCR will not do the same when Criterions enter the secondhand market and go into competition with whatever it wants to sell next.

# Value of Law

Because of its understanding of the law, a court would be able to stop such chicanery; only a fraud charge need be filed. On the other hand, an arbitrator with a DP background is unlikely to have a detailed knowledge of DP, business and law.

Even if an arbitrator is proficient in all three areas, the legal requirement of "clear proof" of fraud creates difficulties. NCR would fight discovery, the right of the lawyers in court cases to see secret papers and talk to potential witnesses.

So, the whole matter becomes a hidden "Catch 22." You can't prove fraud until you get discovery, and you can't get discovery until you prove fraud.

No, I can't agree with Brandon. Arbitration clauses should be made optional or abolished, at least until they are narrowly defined and genuinely protect users' rights.

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# Suffering from system hang-up? DOCS-Display Operator Console Support has the cure...

The hang-ups in most IBM S/360 and S/370 systems are directly related to the system console functions whether the native console is a typewriter or a display unit. **DOCS** permits the entire system to approach its full potential. Here's why:

		Native console support is slow.	perform 20-40% faster.	current status of the system.	Display details job names and
	HANG-UP: The console is attached to the CPU.	CURE: DOCS provides physical flexibility by allowing the con- sole to be as much as 2000		program names which are currently running as well as those that are waiting and the resource they are waiting for.	
		feet away from the CPU.	HANG-UP: DOS and DOS/VS support	CURE: DOCS supports multiple	
		HANG-UP: Outstanding reads go unnoticed.	CURE: DOCS shows all reads in high intensity and optionally	only one console.	consoles.
			sounds the audible alarm on LTA reads.	DOCS will run on both \$1360, \$1 and give added support beyond to program products on the \$13701	
		HANG-UP: Convential DOS and DOS/ VS allow only single thread console activity.	CURE: DOCS permits concurrent con- sole activity including Multiple Outstanding Reads.	DOCS will run along with other s	pooling or control packages
		HANG-UP: The system hangs up when the convential console device becomes inoperable.	CURE: DOCS allows the system to continue to write messages to the CRT thereby allowing the CPU to keep on running.	DOCS is available from C F S. In and may be leased monthly, year arrangement for \$175.00, \$1.890 respectively. All three plans inclimaintenance for as long as DOCS to C F S Send requests for DOCS to C F S	ly or on a one-time lease .00 and \$5,670.00 ude free i is installed.
		Someone needs a copy of SYSLOG data for a job being run.	CURE: DOCS provides all SYSLOG data in any or all of three ways: 1) Trickle hard copy to a typewriter or 3270 type printer. 2) All SYSLOG data can be printed on SYSLST at end of job time. 3) DOCSLIST	ments along with detailed inform by return mail. Inquiries may be Director of Marketing CFS, Inc. 1330 Boylston Street, Chestnut Hill, Massachusetts 02167	Suite 608
		Se Million Dollar Club	provides a time-stamped archival listing of all SYSLOG data.	(617) 566-0222 Telex 94-0285	
•					
		Director of Marketing C F S. Inc. 1330 Boylston Street, Suite 608 Chestnut Hill, Massachusetts 02: I am interested in DOCS on the form on the lease yearly lease one-time lease please have your representation	ollowing basis		CS
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# Now in Two Settings

# 'Edpep' Links Firms, College, QED

By Don Leavitt CW Staff

TEANECK, N.J. - The main campus of Fairleigh Dickinson University here is the setting for an unusual DP-oriented professional training program that involves the university, nearly a dozen New York- and New Jersey-based corporations and QED Information Sciences, Inc.

Modeled after a similar program QED has run with Babson College in Wellesley, Mass., for New England companies since 1974, the EDP Education Program (Edpep) blends the training needs of the local companies with the facilities of the university and instructors provided by QED.

Fairleigh Dickinson has initiated another program for DP professionals this fall, leading to a Masters of Business Administration degree in management. It's a two-year "weekend option" program that allows people to grow professionally while continuing their job assignments, the university explained.

The initial member companies of the Dickinson-based Edpep include American Cyanamid, American Hoechst, Ciba-Geigy, Educational Testing Service, Interspace Corp., Lederle Laborato-Medical Economics, Schering-Plough, Squibb and TRW, Inc.

Each of these member companies has purchased one or more subscriptions to a series of nine seminars and workshops being conducted at the university. Each subscription entitles the company to one seat in each course.

The New Jersey Edpep is under the joint directorship of Robert Sedwick, dean of the College of Business Administration at Fairleigh Dickinson, and Lawrence Grodman, president of QED. The project coordinator is Bruce Frank, a well-known DP consultant and instructor.

This fall's schedule includes 32 days of classes. The first subscription costs a company \$2,400 well below the cost of a comparable amount of training provided cial seminars, according to Grodman.

Additional full-program subscriptions cost \$2,000 each. Member companies may also enroll additional people in selected courses at "very nominal" fees, Grodman said.

#### Cooperative Planning

Planning for the courses is in the hands of the member companies. An advisory council that consists of the training director from each company meets regularly to monitor and fine-tune the program, discuss possible courses and generally maintain control over the content and quality of the program.

The cooperative nature of the Edpep approach is emphasized still further by the exchange of personnel between the Boston and New Jersey programs. If seats are available, employees in member companies of either program can take any courses they want, up to the limit of their company's subscription.

Whether at Babson or Fairleigh Dickinson, Edpep is still open to other interested companies and some of the courses - especially new offerings - are open to nonmembers as well, according to Page 29

SOFTWARE & SERVICE

Courses in the 1978 fall program at Fairleigh Dickinson include a five day systems analysis workshop, three days on "Fundamentals of Data Communications," three days on "Project Management and Control" and five days on "Effective Systems Design.

Distributed computing systems will take three days; data base design systems, four days; and structured design and programming, another four days.

Completing the spectrum, from each end of the software life cycle are two days devoted to the user's role in systems development and three days on computer control and audit.

Having the Fairleigh Dickinson operation under way and the Babson Edpep well established, Grodman admitted his company is now discussing the possibility of initiating Edpep in "several cities across the U.S." with major universities.

QED Information Sciences is at 141 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

# Monitor MVS Compatible

ANAHEIM, Calif. - A feature that allows IBM MVS and TSO users to develop programs online and dynamically execute them after setting breakpoints is part of Release 3 of the Tone 3 time-sharing monitor from Tone Software Corp.

Under the Test feature, when a program is interrupted, register contents, storage locations, instructions and program status words can be examined for verification of correct execution. The user can then resume execution and check later at another breakpoint, a spokesman noted.

Several enhancements have been added to this version of Test, he added. They include the ability to list breakpoints that have been set and a WHERE command that lets the user know where he is in the execution of his program.

Release 3 will support the IBM System/32 and 43-line 3270 devices with all 24 program function keys being user-program-

up and 3790 Synchronous Data Link Control (SDLC) terminals. Tone 3, including the Test facil-

mable, as well as IBM 3275 diality, costs \$26,500 or \$825/mo, the company said from 1124 N. Gilbert Ave., Anaheim, Calif. 92801.

# ook' Gets Enhancement ptions

PRINCETON, N.J. - Histogram and point-plot facilities are two features Applied Data Research, Inc. (ADR) has included as a part of an optional enhancement package for its Look realtime performance evaluation sys-

Extended Performance Analyzer (EPA) option operates in conjunction with Look on IBM 360 and 370 mainframes under OS/MVT, OS/VS1 or OS/VS2.

# Long-Term Measures

The enhancement package is a long-term measurement facility for calibrating system performance that is capable of summarizing the data provided by Look and recorded by Looklog, according to a spokesman. EPA analyzes and condenses performance data and presents output in the form of histograms, point plots and statistical summaries of system utilization.

EPA and effectively detect system imbalances, monitor resource consumption, plan for additional resources and capacity, tune installation performance specifications (IPS) in MVS and measure the effects of environmental changes on total system throughput and availability, the spokesman claimed.

The analyzer's command structure reportedly allows users to specify scaling factors, line components, graphic overlays and other output characteristics, as

well as to individually define job, task and/or resource categories.

The package can also be used to display multiple resources on the same graph or summary, the spokesman noted.

#### **Looking for Trouble**

EPA features an archival capability that compresses large volumes of data and a trend analysis function that helps the user anticipate potential trouble spots and make management decisions.

The EPA option sells for a permanent license fee of \$3,500; Look itself is available for \$5,300 to \$6,000, depending on the user's configuration. ADR is at Rt. 206 Center, Princeton, N.J.

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# Users to Meet

NEW YORK - Users of the Inquire software from Infodata Systems, Inc. will be meeting at the New York Sheraton Hotel next week.

The conference will include information about Infodata's product development, user presentations and a choice of workshops, a vendor spokesman said from 5205 Leesburg Pike, Falls Church, Va. 22041.

# Sort Facility, Too Indexed Files Supported on Series/1

package that reportedly includes both a comprehensive indexed access method and a sort facility for users of IBM Series/1 minicomputers run-Executive (EDX) operating environment is now available from the Systems Guild, Inc.

With the Guild software, multiple indexes can be created and maintained for logic; as processing is comple-

THORNWOOD, N.Y. - A any data file, according to a spokesman. An indexed file may be read sequentially forward or backward by any index, he claimed.

Single records can be rening under the Event Driven trieved by either full or partial key, he added.

Handling multiple files concurrently, whether accessing or sorting them, entails the use of multiple copies of the Guild ted for one or more files or indexes, however, the related copy of the software may be terminated and its storage released to the EDX supervisor, the spokesman noted.

Sorting is easily handled, he added. The sort feature builds an index with the desired sort key, which can be specified at runtime. The index can then be read sequentially to process the file in the sequence de-

The package has limits, the spokesman acknowledged. It can handle files only up to 32K records long and the records can have a maximum of 256 bytes.

Each copy of the software, including all of its internal buffers, will occupy approximately 4K bytes of main mem-

A single machine license is available for \$500 from The Systems Guild, Inc., 103 Westlake Drive, Thornwood, N.Y. 10594.

# **APL** Ready For Z80s

SAN ANTONIO, Texas -For many applications, the power of APL/Z80, an APL interpreter for Z80 microcomputers, is comparable to the power of APL on a large timesharing computer, according to the interpreter's vendor, Vanguard Systems Corp.

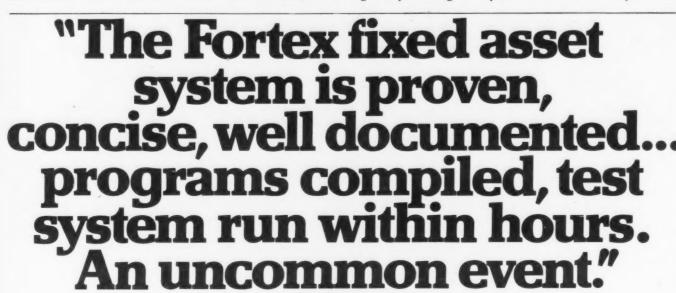
Nearly all primitive APL functions and operators are implemented in APL/Z80, a spokesman claimed. Those primitives not present are easily implemented" as defined APL functions, he added.

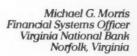
This implementation appears to support a 35K-byte workspace, slightly larger than the 32K bytes originally supported by IBM versions but much smaller than the workspaces provided by both IBM and some of the major timesharing firms that feature

APL/Z80 object code for Digital Group Z80 systems is available for immediate delivery. APL/Z80 running under the CPM operating system will be available later this fall, the spokesman said.

An APL/Z80 end-user object code license is available for \$300 for each MPU.

OEM licenses are available for object code and source code, Vanguard said from 6812 San Pedro, San Antonio, Texas 78216.





Mr. Morris calls it an uncommon event, but at Fortex it's merely our normal way of doing business. All Fortex software product systems are operational; they are productionproven systems; they are concise and fully documented.

All Fortex systems, fixed asset, credit or A/R; on line or batch are easy to set-up and install because they are operational systems. Refering to Virginia National Bank-

shares' purchase of Fortex PIMS, Mr. Morris stated, ...our data processing folks are much impressed with the concise, tested and well documented manner of the System. The material and information was so clear that the programs were compiled and the test system run within hours of receipt of the tape...an uncommon event."

But we realized our deepest sense of pride from what Mr. Morris describes as, "One of the most significant aspects of my dealing with Fortex...their excellent responsiveness to inquiries regarding use of the system, even in aspects for which it is not designed. This is again an uncommon occurrence in my experience."

When asked what he liked most about Fortex PIMS System, Mr. Morris stated, "to summarize, PIMS is:



□ a concise, tested system with sound data processing integrity □ a well documented, user oriented system □ a system with flexibility for implementation □ a product from a company which has obvious pride. So, when your priorities dictate a new software package, call Fortex. We can provide you with a proven modular package that features ease of use, technical support, quick response, cost savings, DP efficiency

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# Users Report First Day Experiences

# **OMEGAMON Producing Dramatic Results**

MARINA DEL REY, CA. — "Saved IPL's" — "solved response time slowdown" — "found hardware problems" are a small sample of accounts given by MVS users of OME-GAMON within 24 hours of installation.

OMEGAMON functions on its own requiring little or no training as reported by a site in TORONTO which stated that the day OMEGAMON was put in there wasn't enough time to give the third shift operators any instruction on its use.

#### Automatic Exception Analysis Saves IPL

In the early hours of the morning the OMEGAMON Exception Analysis started flashing on a CRT set up beside the master console. Using the 'English like' messages the operators were able to save an IPL!

An installation spokesman said "Traditionally, it has been difficult to have operators determine the exact cause of a problem and take steps to correct the situation. With OMEGAMON the operators are automatically warned of an impending difficulty and can usually make the necessary adjustments before any users are impacted."

From the East Coast of the U.S. comes another first day experience this time involving IMS. Within the first 30 minutes after OMEGAMON was installed, IMS response time seriously degraded. A quick look at the

# Installations Misusing RMF Data

NEW YORK — A survey of MVS installations indicates that sites relying on RMF reports for decisions regarding system performance are frequently not receiving results expected from changes made through use of RMF data.

Reasons have been traced to five sources:

- Improper calculations and use of wrong data in reports
- Analysis of items that have little or no effect on performance
- Incomplete understanding of the value of RMF data
- Erroneous belief that RMF data is accurate
- Relying on RMF as the only source of information

A copy of the complete survey is available free from Candle Corporation at 4676 Admiralty Way, Suite 401, Marina del Rey, California 90291.

#### MVS Seminars for Operators

Candle Corporation has announced a series of free seminars directed at operations personnel using IBM's MVS operating system. Subjects will include basic monitoring needed by operators, monitoring methods, enqueues and reserves. Case studies will also be discussed.

A seminar schedule is published in the October 16 and October 23 issues of Computerworld. For more information contact Candle Corporation at (213) 821-2902. OMEGAMON Exception Analysis display showed why. OMEGAMON was warning that the IMS address space was locked out from the control unit assigned to the IMS log tape used for transaction recording to rebuild the data base in case of a catastrophic error. OMEGAMON displayed another job with a tape in a runaway situation on the same control unit which prohibited IMS from accessing the log tape. The user quickly corrected the condition and IMS started running again.

#### First Display Shows Answer

One of the most impressive displays of fast diagnosis took place at a West Coast manufacturer. Just as OME-

GAMON started it flashed warnings of a dropped ready disk drive and noted several jobs that were waiting on it.

A number of installations have reported receiving warning messages on MSS (Mass Storage System) devices that have located hardware problems requiring vendor support.

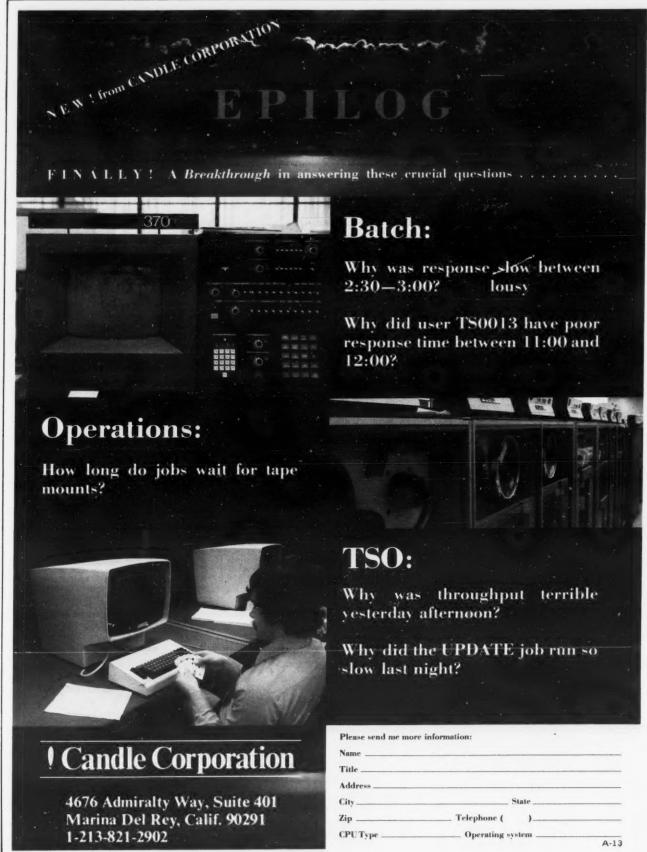
Another story comes from the Midwest where a user was installing OMEGAMON at a branch location. (Installing OMEGAMON takes only 20 minutes — there are no hooks, no SVC's, or authorized requirements).

# Finds CICS Response Problem

The user spokesman said "While re-

viewing the standard OMEGAMON displays, I spotted what seemed to be a problem with CICS. I called operations but they said everything looked fine — there was no response problem. Egged on by the flashing OMEGAMON display I called a CICS user and asked if there were any problems with CICS response. He said, 'Sure, we were just about to call to ask what was wrong!' I called operations back and told them about the problem. A simple change and response was back to normal."

OMEGAMON is available from Candle Corporation, 4676 Admiralty Way, Suite 401, Marina del Rey, California, 90291, Telephone (213) 821-2902.



# 'Plan IV:MVS' Enhanced

systems management package from Capex Corp., available now, offers expanded analytical reporting and graphing capabilities, resulting in increased information at the analytical level for managing overall MVS performance, according to a Capex spokesman.

Service Objective Graphs will furnish users of IBM's most sophisticated operating system with one graph for each active objective observed. The graphs plot the actual service received by objective and, for ease of reference, superimpose the user-defined service objective over the actual service observed, the spokesman explained.

This feature will clearly show the

PHOENIX - Release 5 of the Plan overall impact that IPS specifications are having on the MVS System Resource Manager, he noted.

The overall tuning of MVS is also enhanced with the addition of the Domain Summary Report, the spokesman said, adding that this report will highlight service consumption for each active domain defined to the system.

Several other distribution graphs have been added to the output of Plan IV:MVS to assist in the tuning of IPS, the balancing of workloads and other factors in MVS resource management, according to Capex.

The updated package is available for \$15,000 or \$700/mo from Capex headquarters at 2613 N. Third St., Phoenix, Ariz. 85004.

# **Encyclopedia Update Lists** 2,000 Information Sources

DETROIT - Like its predecessors, the third edition of the Encyclopedia of Information Systems and Services (EISS), published by Gale Research Co., is intended to be a comprehensive guide to the "information marketplace": to buyers and sellers and to the products and services they provide.

The organizations listed in this 1,000-page hardcover book include computer service companies, publishers, libraries, professional societies and government agencies, as well as research organizations, information centers, micrographic firms, clearinghouses, consultants and "others."

Services covered include data base publishing and vending, time-sharing, selective dissemination of information, information on demand and retrospective search services.

Data collection and analysis, computerized text editing, networking, research, micrographic storage and retrieval are also included, according to a spokesman.

#### Not Software Directory

EISS is not a software directory that lists packages and their vendors. Also excluded are printed commercial and legal services, academic and special libraries with traditional reference services only, public information offices, computer and micrographic hardware manufacturers and distributors, the spokesman said.

There are more than 2,000 entries in this edition, he continued, but - returning to the negative - these do not include general-purpose data management systems, conventional indexing and abstracting services, libraries with minimal automation activities and network participants with special services of their own.

The book costs \$95. Supplements the first is scheduled for release in March — cost \$60 each, Gale said from Book Tower, Detroit, Mich. 48226.

# 'Map/3000'Aids **Manufacturers**

LONG BEACH, Calif. - Data Systems for Industry, Inc. (DS/I) has released a manufacturing-oriented software package for Hewlett-Packard Co.'s HP3000 large-end minicomputer that is said to be an integrated extension of HP's standard MFG/3000 soft-

Map/3000 is implemented in Cobol, requires 120M bytes of disk storage and two magnetic tape drives and operates with a minimum of 256K bytes of main memory, according to a DSI spokesman.

The package is broken up into separate application modules and utilizes HP's data base management system, Image, for on-line terminal transaction processing. The system performs batch processing functions via keyed sequential access methods (Ksam), the spokesman said.

The software's modules support order entry, master scheduling, shop floor control, capacity planning, job costing, physical inventory processing and finished good inventory extensions in addition to HP's MFG applications of engineering and data control, inventory and order status and net material requirements planning, the spokesman noted.

The HP MFG/3000 system, which can be purchased from DSI, costs \$15,000. The Map/3000 extensions cost \$5,000 to \$15,000 and are warrenteed for the first year; after the first year, optional maintenance plans are priced from \$50 to \$150/mo except for the payroll program, which costs

Documentation and manuals are supplied with each module and training is available at a cost of \$35/hour, DSI said from 3450 E. Spring St., Long Beach, Calif. 90806.

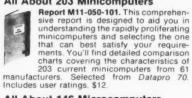
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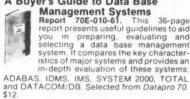
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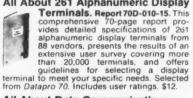


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This 46-page report provides minicomputer users and suppliers with a compension that compared in the current product lines of 37 suppliers, and the accompanying text offers the reader an enlightening guide for evaluating disk and drum storage performance. Selected from Datapro Reports on Minicomputers. \$12.

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Report \$13-040-101. This comprehensive 82-page survey summarizes the characteristics of over 100 models of automatic typing and test editing systems from 50 vendors. Detailed comparison charts describe each model's basic configuration, pricing, storage medium and capacity, editing features, printer characteristics and much more. Selected from Datapro Reports on Office Systems. Special Price: \$15.

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Report 70H-100-101. This 189-page directory contains informative profiles of 925 companies that offer EDP products and services of all types, plus guidelines for interpreting the information and selecting qualified suppliers. You'll find entries describing each company's location, size, executives, financial status, ownership, sales and service organization, and product line. Selected from Datapro 70. Special price: \$15.

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# Tucson Builds On-Line System

# 'Pesos' Saves Dinero by Inventory Control

TUCSON, Ariz. — According to Tucson City Manager Joel D. Valdez, responsible financial management involves much more than the traditional concerns with such matters as a city's investment program, bonding capacity, debt service management and budgeting strategies.

"For example, during the past two years we have developed and implemented a computer-based purchasing and inventory control system which has brought about a \$750,000 reduction in the value of inventory in our city's seven stores. Those dollars can now be put to work in areas where they are badly needed, such as for improved police or fire protection, without additional taxation," Valdez noted. With a population of 350,000 and

With a population of 350,000 and more than 500,000 in the surrounding metropolitan area, Tucson has some unique purchasing and inventory problems because it is the largest city in the world which depends entirely on an underground water supply.

The city owns and operates the water utility and supplies water to the entire metropolitan area from approximately 300 wells, some of which are located many miles from town. The water department, therefore, must maintain an extensive inventory of pumps, meters, pipes, valves, fittings and other items to keep the wells and the distribution system operating at peak efficiency.

Additionally, the city manages public housing, which means still another unique category of items must be bought and inventoried for repair and maintenance of the housing units.

#### Recently Automated

Although the city has had a centralized DP operation for many years, prior to early 1975 the inventory control function was completely manual.

"At the time, there were about 10,000 line items warehoused in our city stores. With the volume of receipts and issues growing constantly, it was virtually impossible to keep the card file up to date," Valdez recalled. The result was that items could be out of stock for several weeks before the buyers knew it.

To avoid stock-out situations, most buyers had a tendency to overbuy, resulting in many dollars being tied up in excessive inventory.

When Valdez became city manager in early 1974, he began improving the efficiency of all city departments through the development of advanced DP systems. He upgraded computer services to a major department, headed by a director who reports directly to the city manager. Previously, this operation was a function of the City Finance Department.

The purchasing Electronic System for Operating Services (Pesos) is one of several systems the department developed since 1974. "However, I consider it a cornerstone in what is becoming a very effective financial management system." Valdez said.

The city has continually upgraded its DP hardware. Pesos and other programs now run on a 1.5M-byte 370/-158 with 12 Model 3350 disk drives, associated tape drives, high-speed printers and other peripherals. System software includes DOS/VS which runs under VM/370, Vsam for file

handling and CICS for on-line support.

Three IBM 3270 CRT terminals and a 3287 line printer, located in the purchasing department at City Hall are dedicated to Pesos. At the central stores office, several miles away, there is an additional terminal and line printer, plus a dual-station IBM 3742 data entry unit.

Development of Pesos, which extended over a period of 18 months, was accomplished in close cooperation with the purchasing department — the primary user — as well as with major operating entities impacted by the system, such as accounting, the water utility, the fire department and the op-

erations department.

"We took the systems approach in developing Pesos," Richard A. Cronican, director of computer services, explained. "We first met with all users and defined the major problem which needed solving. Then we had the users prioritize their problems, calling for a great deal of interdepartmental cooperation.

"We feel that much of the success of our information systems has resulted from this type of user involvement right from the start," he said. "For example, during the development of Pesos, the assistant city purchasing agent, Wayne A. Casper, devoted more than half of his time to working with

our systems development staff."

The backbone of Pesos, according to Cronican, is an extremely flexible data base with segmented data files that provide for file independence and facilitate on line data collection as well as update and inquiry capabilities.

In addition to basic identifying information on each of approximately 16,000 items, the data files contain current purchase order information, complete vendor records and cost and usage factors for calculating economical order quantities, including a three-year usage history and a purchasing/price history covering the last 10 buys on every item of inventory.

(Continued on Page 34)

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# Easing the LTA Bind

CHESTNUT HILL, Mass. Described as release-independent and capable of supporting IBM DOS/VS systems with as many as 15 partitions, CFS, Inc.'s Multiple Transient Support (CFSMTS) package enhances operations by providing more than one transient area at a time.

CFSMTS provides a unique Logical Transient Area (LTA) for each problem program partition as well as a separate LTA for the system's Attention routines. This means each program can concurrently execute code that requires an LTA, whereas it formerly had to run serially through a single LTA, a spokeswoman explained.

The package provides a dynamic

classification facility to control concurrent usage of \$\$B transients that are dependent on a single resource, but the user may also classify his own or any other transients, she added.

The software is said to accumulate statistics and provide, on demand, a report showing any overlap that has been gained.

A summary of elapsed savings is also calculated both in terms of time saved and its percentage of the entire processing cycle, she said.

CFSMTS is available for a one-time fee of \$4,275, for an annual fee of \$1,425 or for \$130/mo, she concluded from Suite 608, 1330 Boylston St., Chestnut Hill, Mass. 02167.

# **Tucson Controls Inventory** By Using On-Line 'Pesos'

(Continued from Page 33)

Most primary functions of Pesos are handled on-line. For example, clerical staff enters purchase orders directly to the system via a terminal. Receiving is also an on-line procedure.

The stock-issue cycle is the only procedure that is not on-line. It was determined by the purchasing department that a greater volume of issue information could be captured in a given period of time using off-line key-todiskette data entry and batch process-

#### **Physical Inventory Eased**

Pesos also facilitates the taking of the physical inventory at the seven stores.

Because of limited manpower, Tucson uses the cycle inventory method, where a predetermined number of items is counted daily.

Each day the store determines the number of line items to be counted; on instructions entered through a terminal, the system provides a worksheet list of those items on the line printer in the warehouse

The person doing the inventory count simply writes in the quantity of each item on the form, and these quantities are then entered through the terminal. The system compares the actual quantities with those in the inventory file and prints an exception report listing all items that do not match.

This list is used for a recount the following day. On those items that still do not match, Pesos produces a report which details all transactions for those stock items since the last inventory count. This report helps to determine the cause of an imbalance.

On a quarterly basis, Pesos recalculates the economical order quantity for every line item. Whenever the onhand stock of an item reaches its established economical order quantity, the system produces a buyer action report, providing a three-year cumulative history on issues and purchases, plus vendor/cost statistics and other information needed to make the final purchasing decision.

The system also generates other reports for both buyers and purchasing management. These are available either through on-line inquiry or in hard

The purchasing department presently issues some 12,000 purchase orders a year, representing an annual expenditure of over \$45 million. A spokesman there said, "I would hate to think of trying to handle this volume of work without Pesos. By now, we would have to add several more people in both purchasing and inventory control, and costs would rise to an intolerably high level."

# Seminars Planned For DP Neophytes

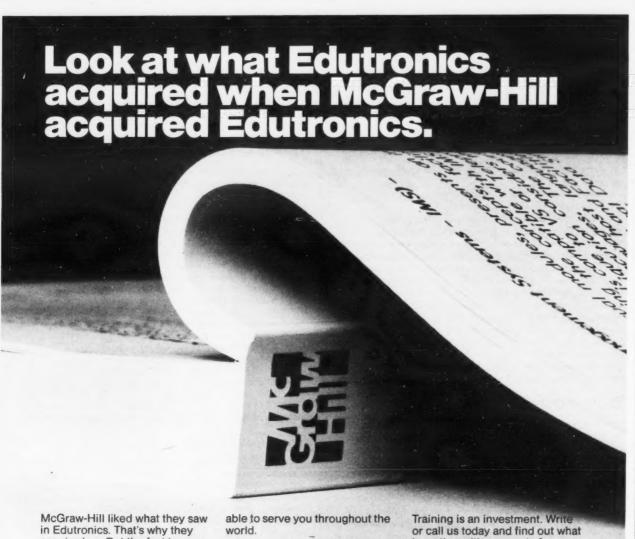
DELRAN, N.J. - Data Processing: An Introduction to Concepts and Systems, a technically oriented three-day seminar for the newcomer to DP, is being offered by Datapro Research Corp.

In addition to a session in Washington, D.C., starting today, the \$485 seminar will be held in Chicago next week, in San Francisco in November and in New York in December, the company said from 1805 Underwood Blvd., Delran, N.J. 08075.

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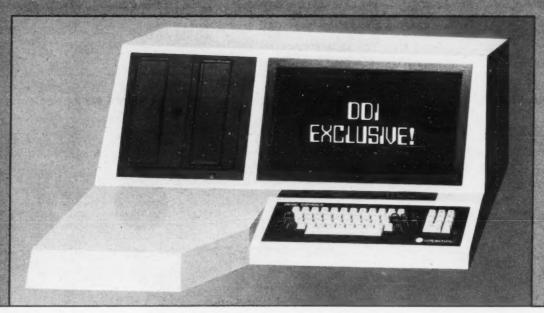
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### 'Future Shock' Seen Coming in Data Base Use

By Stephen L. Robinson

Special to CW Those of us who have read Toffler's Future Shock, or other analyses of today's society, are aware that one of the major problems we face is that both the first and second derivatives of change are positive. That is, not only is the velocity, the rate of change, positive; but the acceleration,

the rate of change of change,

is positive.

In DP terms, this means we can expect the gaps between hardware and software generations to narrow. In order to

insulate ourselves Data Base against such Corner change, we

seek con-

cepts that will span implementation variations.

Data base systems are one

rate a philosophy of data organization quite different from hardware and software.

Still, they are typically implemented using a particular software package on a particular computer.

Nonetheless, the concepts of shared data, of a corporate view of data, of data as a corporate resource, of controlled and synchronized data redundancy and of data administra-

such concept. They incorpo- tion are quite different from hardware and software considerations.

At least they should be, which brings us to the main subject of this column.

### Threshold of Change

As IBM's 8100 [CW, Oct. 9] makes abundantly clear, we are on the threshold of a major change in DP hardware, Minis and micros are no longer suitable only for playing Star

Wars at expositions.

They have arrived. They compilers, data base report writers, packages, query languages and, unfortunately, even operating systems

The major factor retarding their spread in the business world is not their capability but our ability to envision how to use them effectively. This will change, albeit somewhat slowly.

Unfortunately, one area that may suffer the most during this transition is the philosophy of data base systems.

As indicated in a recent Data Base Corner, data base system philosophy has, for the most part, not really come of age. It is too intimately linked with DP techniques, as opposed to data organizational considerations. Therefore, it would not be surprising if a major hardware change, with associated technical changes, had a significant impact on data base philosophy.

### **Nefarious Aspect**

The nefarious aspect of mini/micro DP - from a data base system philosophy viewpoint - is that it returns control of data processing to the user. It is assumed the users will, therefore, endeavor to control their data base as well as their DP.

For example, if I am the manager of a distribution center for a manufacturing company, I probably currently rely on a corporate facility for the design and implementation of the requisite DP sys-

While I may indeed have my own intelligent terminals, or complete remote workstation, I am probably accessing data from a central source which keeps track of inventory and production at many sites.

The systems I run were probably developed remote from my site and probably represent a compromise of sorts on the running of similar but admittedly different distribution centers and production sites.

(Continued on Page 38)

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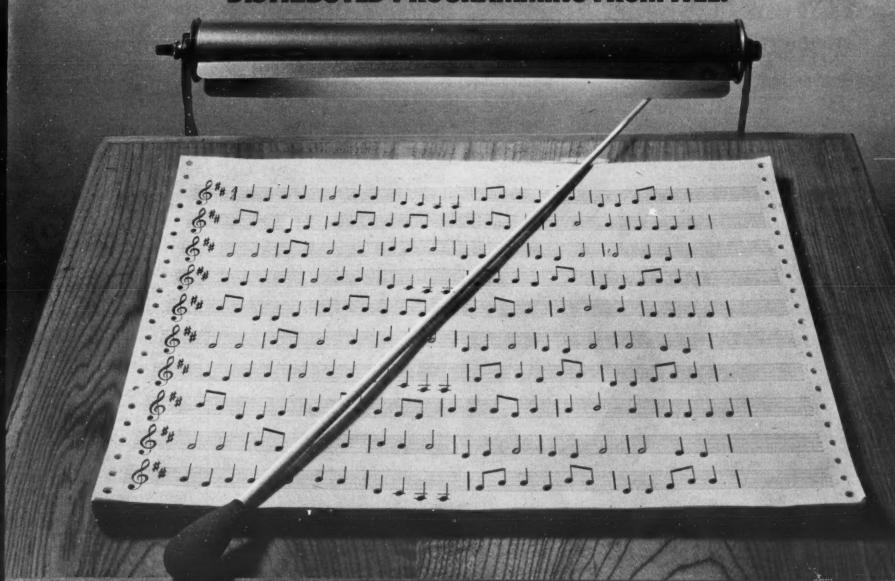
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LITTLE ROCK, Ark. — Companies in the seed industry should be able to use a Cobol program developed and now offered by Arkansas Systems, Inc. (ASI) for seed inventory, management and bookkeeping on any of several small business systems, an ASI spokesman said.

The package prints and posts delivery tickets and confirmations of sales. It also posts — among other things — grain tickets or receipts to storage, purchase contracts, returns, move orders, sacking orders and changes in classification, he continued.

Invoices, statements and management reports are also part of the \$15,000 package, which currently runs on a Burroughs Corp. B1700. ASI is at Suite 206, 8901 Kanis Road, Little Rock, Ark. 72205.

## DPers Still Unable to Appreciate Impact of Distributed Data Bases

(Continued from Page 36)
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world of minis and micros. For less than \$10,000 I may be able to configure a system with all the computer power necessary to manage my facility.

Using Basic, or another simple programming language, I discover I can write programs to generate precisely the infor-

mation I require, not what some bright systems analyst in the corporate department thinks I require.

Flushed with success at my venture into decentralized DP, I begin to build my own data base. With some luck, I may shortly be able to cut the umbilical cord, or communication link, to the corporate computer facility.

I now go around to computer conferences bragging in six months, how I am saving X dollars per month in computer charges, how I am now the most efficient distribution center in the company, ad nauseum.

Looks good, you say. How can anyone object to this utopia? Let's stay with the company awhile. During the next year, several sites "decentralize" themselves.

Shortly thereafter, the company's market share begins to dwindle; two years later it verges on bankruptcy. Why? Corporate decision makers have no information with which to work.

All the little data czars have cut off the supply of data. A simple task, such as assessing the short- or long-term supply of a particular product, which requires access to data from several distribution and production sites, becomes impos-

Clearly, distributed, not decentralized, DP and data bases are needed.

### **Bleak Future**

I believe that data base is in a rough road in the early days of minis and micros. This is primarily because I believe we will actually be seeing mostly decentralized, rather than distributed, DP and data bases.

Distributed processing and data bases require extensive planning; decentralization can be accomplished quickly, if not always easily.

Decentralization restores "power to the people," a popilar byword these days' distributed processing and data bases require conformity to a centrally developed set of policies, procedures, standards and so on. Properly developed, such rules can present minimal problems for each code in a distributed system.

Unfortunately, human nature being as contrary as it is, any constraints are often viewed as too many.

Thus, minis and micros are likely to have a detrimental effect on a company's transition to a data base system. But this is because there is a basic conflict between data base system philosophy and decentralized DP and decentralized data bases.

Those organizations that take the time and expend the resources to study minis and micros, examine their DP requirements and develop corporate data models and data base system plans will be in a position to reap the benefits of our changing technology.

Robinson is an independent consultant, operating as S.L. Robinson & Associates of Morrisville, Pa.



# IDMS...the DBMS for the second time around.

IBM

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If you were a forward thinker who installed a then-available DBMS in the early days, congratulations. But if you're still using it, condolences. That antiquated DBMS needs patching, updating and

requires too much hardware and too many people.

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dramatic increases in performance and substantial people and mainframe savings.

Example: a major U.S. bank converted from IMS to IDMS in a database/datacommunications environment for its CIF file. Results? Entry operators reported on-line response times cut from 20 seconds to under 2 seconds. IDMS used only half a previously saturated computer and 1½ people were freed from full-time technical support.

If you have an IBM 360, 370 or 303X computer and would like to see what IDMS can do for you, write or call Cullinane Corporation, 20 William St., Wellesley,

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Database: Cullinane

### Compiler, Cross-Assembler Run Rockwell 6500

**PL/65 LANGUAGE STATEMENTS** Specification Declaration DECLARE DEFINE ENTRY DATA Comment Conditional IF-THEN-ELSE BEGIN-END CASE Single-Byte Move Multiple-Byte Move Imperative Branching GOTO CALL RETURN ROTATE CLEAR SET SET CODE HALT WAIT STACK UNSTACK INC INCW DEC BREAK FOR-TO-BY WHILE

language described as resembling PL/I and Algol is available from Rockwell International for designers developing programs for the R6500 microprocessor family using either the System 65 development system or Digital Equipment Corp.'s PDP-11 minicomputer.

PL/65 is said to be "considerably easier" to use than assembly language or object code, thus increasing programmer productivity while reducing software development time and costs. The PL/65 compiler outputs source code to the System 65's resident assembler, according to a spokesman.

This two-tiered approach permits enhancing or debugging at the as-sembler level before object code is generated, he explained. In addition, PL/65 statements may be mixed with assembly language instructions for timing or code optimization, he noted.

The PL/65 language reportedly supports modular program design. Its general control structures for conditional or iterative looping allow the language to be used effectively in structured programs, the spokesman claimed.

### Other Features

Other language features are said to include assignment, integer arithmetic, conditional execution, collective execution, linear array manipulation, data area declaration and array manipulation. Block structures, subscripts and parenthetical expressions are also supported, the spokesman asserted.

in the NMOS 6500 microprocessor and the compiler is available to System 65 users on a mini diskette. It costs \$500 from Rockwell's Electronic Devices Division, 3310 Miraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803. For PDP-11 users, a PL/65 compiler, for \$500, and a \$600 Minmic crossassembler, both of which run under RT-11, are available from Compas Microsystems, 224 S.E. 16th St., P.O. Box 687, Ames, Iowa 50010.

### **Financial Data** Now on GE Net

ROCKVILLE, Md. - Multinational companies engaged in the time-critical business activity of international currency translation may be able to speed up and ease that process by means of a proprietary, on-line currency exchange data base available via General Electric Co.'s Mark III remote comput-

Financial managers accessing the Currency Exchange Data Base can obtain daily currency exchange rates for 34 currencies in 32 countries, including bid and offer rates (New York market) and futures for one, three, six and 12 months over the past 90 trading days, a spokesman said.

for 46 currencies and yearly for 43 currencies. Daily data is obtained from the International Treasury Division of Marine Midland Bank. Monthly and annual data is obtained from the International Monetary fund, he added.

Financiers can use that information in conjunction with GE's financial analysis and data base management programs. These programs were designed to give business money managers the ability to consolidate international accounting or budget data and improve their methods for business forecasting and financial planning.

Other management functions, such as cash consolidation, accounting, inventory control, order service and sales/marketing analysis systems are also available over the Mark III computing network. Technical support services for customers as well as customized programming services can be obtained from members of GE's programming staff, the spokesman continued.

Mark III service offers multinational firms a teleprocessing network that now reaches 22 countries from three GE computing centers - in Cleveland; Rockville, Md; and Amsterdam, The Netherlands.

Washington, Rockville, Md. 20850.

Additional data is provided monthly

The operation is based at 401 N.

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### Enhances Terminal-Host Links

### Burroughs Unveils DDP Architecture

DETROIT - Burroughs Corp. has introduced a network architecture designed to enhance the interaction of terminals with host CPUs in a network environment as well as to facilitate a move into distributed data processing (DDP).

With the Burroughs Network Architecture (BNA), "computers and terminals can be granted access to data bases throughout a network, job tasks and information files can be transferred from one point to another and [DP] resources available anywhere in a network can be shared by participants, regardless of the distance between them." the vendor claimed.

BNA links multiple host computer systems so information can be exchanged throughout a complex user organization, Burroughs said. This will provide smaller sites with resources traditionally concentrated in administrative headquarters, marketing offices,

production plants or engineering centers, a spokesman added.

Burroughs B1700 and B1800 series minicomputers as well as the vendor's larger computer systems can serve as host processors in a BNA network, he noted, and virtually any other Burroughs CPU can serve such an environment - as a peripherals controller, for example.

The architecture is said to allow an "easy upgrade from existing Burroughs communicaitons networks configurations. Users need not acquire "specialized equipment" to effect such a transition, Burroughs said.

### Logical, Dynamic Linkage

According to the vendor, BNA links individual network elements on a logical and dynamic basis rather than on an arbitrary,

The result is a choice of interconnections

for linking any element with another and for altering these linkages to fit changes in data communications line availabilities and local user needs," it said.

A bank with nationwide or international operations could establish a BNA-based DDP system in which individual host CPUs - each with its own data base - could serve customers in specified geographic areas, Burroughs said. The bank could provide its officers with up-to-date financial information to the extent permitted by law and could serve a customer at any branch office in any area.

A manufacturer could link host computers and terminals located at its plants to provide a constant exchange of inventory, production and delivery data, the vendor continued.

Similarly, users at all points in a BNA network could have access via their respective host CPUs to scientific computation or econometric modeling services otherwise limited to users at relatively few locations. By connecting all host CPUs, a business or government agency could acquire aroundthe-clock DP support, even if one or more local host sites were temporarily out of serv-

"The necessary interconnection between host computers can be derived from whatever combination of dedicated leased lines or dial-up lines - including those linked by satellites [or] ground-base stations - provides the desired level of communications service at least cost," Burroughs said.

(Continued on Page 42)

### Merger of Infoswitch, ARC Among Debuts at TCA Show

By Jeffry Beeler CW Staff

SAN DIEGO - An estimated 2,500 visitors to the recent Tele-Communications Association (TCA) conference here probably got a glimpse into the telecommunications future when Datapoint Corp. used the fiveday event to introduce an offering that reputedly weds its Infoswitch product line

and its Attached Resource Computer (ARC) system.

Datapoint officials touted Infoswitch/-ARC as a precursor of the much ballyhooed "office of the future" in which DP, communications, word processing, image processing and other allied disciplines will converge in an integrated system.

They also described the combination product as the first in an imminent wave of offerings that will provide workable alternatives to Bell's communications management tech-

But although Infoswitch/ARC almost certainly highlighted the hardware exhibit portion of the TCA conference, the system was not the only product at the 16th annual gathering to grab the attention of telecommunications equipment users.

Some of the other offerings announced by

the show's 96 exhibitors included three modems, a network diagnostic controller and a network control module from Racal-Milgo Information Systems, Inc.; a microprocessor-based modem and two statistical time-division multiplexors from General Datacomm Industries, Inc.; an intelligent network processor and a modem from Co-

(Continued on Page 48)

### Public Net for Hawaiian Islands **Expected to Save Users 30%**

By Ronald A. Frank

CW Staff

HONOLULU - A public data network intended to save intrastate users as much as 30% over private-line rates is scheduled to begin operating in Hawaii by the end of this

The Data Switched Network (Dasnet II) will link the major Hawaiian islands with 56k bit/sec, data-only microwave facilities of the Hawaiian Telephone Co., according to David Horton, the firm's director of computer communications development.

Dasnet II will eventually be connected with Dasnet I, which provides interstate public data service, including dial-in access to the Telenet packet-switched network.

Both dial-up and private-line services will be offered. Short-haul modems will be employed by users located near Hawaiian Telephone facilities, and conventional data sets will be utilized for longer distance applications, according to Alan H. Okinaka, a project engineer with the phone company.

Services will be provided for users with (Continued on Page 49)

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### Farmers' Net Means New Verse for Old Song

Special to CW
BLOOMINGTON, III. -According to the song, Old MacDonald had a farm with chickens, horses and pigs.

Now, however, that song might need another verse, because Old MacDonald didn't have a terminal.

Located in 14 fuel and fertilizer dispatch sites in remote farming areas of three Midwestern states, terminals are helping FS Services, Inc., a regional farm cooperative, create invoices three times faster. The terminals have also eliminated serious billing disputes caused by the inefficiencies of its previous system, the user said.

FS tried a network of telecopiers after finding that its origional manual mailing system delayed the routing of invoices to accounts receivable by more than one week. "Because of transmission problems and poor print quality, however, that was a disaster from Day One," according to the cooperative's order and billing control manager, Gary Garrett.

FS next thought of linking terminals directly to its Honeywell. Inc. Model 636 mainframe to allow on-line data entry. But the cooperative decided that its low volume of applications did not warrant the hardware and software development costs such a system expansion would entail.

FS finally decided to install a network of Mohawk Data

21/40 terminals. According to the network scheme, billing data is keyed onto diskettes at remote "dispatch sites" during each day and then transmitted via telephone lines to a central Series 21 site at FS headquar-

There the data is again recorded on diskettes and then copied onto magnetic tape for and communications costs. storage on the Model 636.

### **Minimal Programming**

Programming required minimal effort and was completed in about a month, Garrett said. is off-line with all the intelli-

gence we need at the source, communications costs are kept to a minimum," he noted.

Garrett explained that fuel and fertilizer sales are received by 14 dispatch stations from FS member cooperatives. Online systems were considered as an alternative to Series 21, but quickly eliminated because of prohibitive hardware

The most cost-effective way for us to go on-line to the fuel depots was to add onto our present system," Garrett said. We considered that alternative, but each site would have In addition, "since the system cost over \$500 a month to is off-line with all the intelli-maintain. The hardware was too expensive and the full-day telephone connections on-line systems require were not practical for our low-volume applications.

"In addition," he pointed out, "the dispatch sites are in very remote areas and telephone services from those locations is expensive and unreliable.

With the manual system, there was no uniform procedure," Garrett said. "Drivers turned in bills of lading sporadically because it wasn't always necessary for them to go to the depot daily.

'And in many cases the (Continued on Page 52)

### **Burroughs Unveils Architecture**

(Continued from Page 41) A specific protocol is featured that allows a host CPU user to modify data kept at other CPUs in the network or to transfer data from the host to the other CPUs.

Assigning these responsibilities to host CPUs eliminates the need for duplicating them at subordinate levels in the network or for installing specialized processors for this purpose, the spokesman explained.

The system-level programming anticipated for BNA networks follows Burroughs' policy of independence between user application programs and the operating environment, the vendor said.

The Burroughs systems software said to form the "operating framework" for Burroughs networking includes the Master Control Program (MCP) and such applications development aids as the network Definition Language (NDL) and Message Control System (MCS).

To protect the user's present investment in programming, the vendor has devised BNA extensions to its systems software, allowing Cobol, PL/I, Algol and Fortran applications programs to access the network's "full resources."

"Without change to their basic compositions, existing programs have access to the files, data bases and other resources of host computers throughout the network," Burroughs said.

### **Network Services**

A "network services" feature ioins host CPUs on a point-topoint basis via the Burroughs Data Link Control bitoriented procedures and interfaces the hosts to X.25-standard commercial packetswitching services.

Systems in a BNA network can be programmed to communicate with non-Burroughs systems and networks through the use of presently available Burroughs NDL and MCS capabilities.

The network services feature permits intermediate hosts to pass along messages intended for other hosts in the network. Tables are maintained to provide alternate routings in the event a communications line, network component or host computer along with the primary path is not functional.

This feature also allows message segmentation and reassembly, message integrity between two hosts and coordination of messages and responses in transactionoriented and conversational processes, the vendor added.

BNA network security was called the responsibility of each host system. Requests for data from other points in the network are subject to the same degree of security that the receiving host imposes on requests from its own local networks.

Security is thus thought to remain under local control, and changes in the security levels of local records and files can reportedly be made without altering control mechanisms elsewhere.

The BNA is scheduled for availability beginning in the fourth quarter of 1979.

"Licensees have a choice of an unlimited time plan or two limited time plans," Burroughs stated. "Under the unlimited time plan, full BNA capabilities will be available for an initial payment of \$6,000 to \$21,000 and an annual license fee of \$600 to \$2,100, depending on the host system."

Monthly license fees will range from \$200 to \$700 under the three-year limited time plan or from \$192 to \$672 under the five-year plan, the vendor said. Each computer system is licensed separately.



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# Edutronics/McGraw-Hill and Structured Methods present The Structured Forum

### The Structured Forum

Structured Methods and Edutronics/McGraw-Hill are pleased to be co-sponsoring the Structured Forum — a one-day review of the major structured design and development methodologies with special emphasis on the development of the human resources needed to install these new techniques effectively. Conducted between Thanksgiving and Christmas, the Forum will include an in-depth look at the differences, as well as the similarities, between the data flow and the data structure design approaches. In addition, the link between system design and database design methods will be explored.

To represent a broad cross-section of methods, we've invited representatives from the leading consulting/training organizations in the U. S. to present their own particular design orientation. We've also invited a local speaker in each of the 18 Forum cities to present a luncheon address on a timely topic related to software development.

### The Dates

New York Nov 28	Denver Dec 11
Boston Nov 29	Kansas City Dec 12
Toronto Nov 30	Dallas Dec 13
Detroit Dec 1	Houston Dec 14
Chicago Dec 4	St. Louis Dec 15
Minneapolis Dec 5	Atlanta Dec 18
Seattle Dec 6	Columbus, OH. Dec 19
San Francisco Dec 7	Wash., DC Dec 20
Los Angeles Dec 8	Philadelphia Dec 21

### The Program

The agenda for the one-day Structured Forum will consist of presentations on:

Warnier/Orr methodology by a representative of Langston, Kitch.

Jackson Design methodology by a representative of Infotech International.

Constantine/Myers/Yourdon methodology by a member of the Structured Methods staff.

Database Design by a member of the staff of DBD Systems.

Human Resource Development in a Data Processing Environment by a representative of Edutronics/McGraw-Hill.

Attendees will be provided with all Forum materials including the conference proceedings. A buffet lunch will be served and all attendees are welcome to join the speakers in informal conversation during a wine and cheese gathering following the presentations.

### Registration

To register for the Structured Forum, or for any of our other courses, you can write or call collect. Registrations

may be cancelled at any time up to the last business day prior to the first day of a course. Structured Methods does not impose any cancellation fee, provided the above condition has been met.

The fee for the Structured Forum is \$175 and groups of three or more will receive a 10% discount. All attendees will receive a \$100 credit which can be applied toward Structured Methods or Edutronics services or against a list of selections from the McGraw-Hill Computer Science Library.

To reach us by phone, you can call us collect at . . . 212 - 355-2520, or you can call us at one of our local numbers:

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### **New Courses**

In addition to conducting the Structured Forum, Structured Methods is introducing four new courses this fall.

Reviews, Walkthroughs and Inspections will demonstrate that peer reviews improve product quality through discovery and elimination of errors. Participants will learn to communicate effectively with one another in the peer review environment, they will gain the knowledge necessary to conduct appropriate peer reviews during system development, and will become aware of potential problems and possible solutions.

Modern Systems Development - A User Perspective will help the non-technical business staff understand their role in systems analysis and throughout the systems development life cycle. Participants will be familiarized with the processes and tasks of the life cycle, and will be taught the documentation techniques and strategies of structured analysis.

Comparative Design Methodologies is a three-day course intended to increase your awareness of software design theories and practices through a comparison of Infotech/Jackson, Warnier/Orr, and Constantine/Myers/Yourdon design methodologies. Three instructors, each an expert in a different one of the methodologies, will be on hand to conduct the course.

Quality Assurance & Testing Workshop will teach the attendee how to integrate the testing function into the entire development life cycle, with special emphasis on the use of the cause and effect graphing technique to validate the completeness of the business requirements documentation and the code analysis technique to determine the impact of change on existing systems.

### Seminar Schedule

COURSE	DAYS			NOVEMBER 1978
Reviews, Walkthroughs and Inspections	2	\$325	5-6 Chicago	13-14 San Francisco
Modern System Development - A User Perspective	2	\$325	26-27 Washington, DC	2-3 Chicago
Comparative Design Methodologies	3	\$575	25-27 Chicago	8-10 New York
Quality Assurance & Testing Workshop	5	\$625	30-11/3 Boston	
Managing Systems Development — A Structured Approach	2	\$325	2-3 New York 5-6 Dallas 30-31 Chicago	20-21 Los Angeles 20-21 Kansas City 20-21 Cincinnati
Introduction to the Tools and Techniques of Structured Systems Development	1	\$175	4 New York 4 Dallas	1 Chicago 22 Los Angeles 22 Kansas City 22 Cincinnati
Structured Design	3.	\$475	2-4 Phoenix 2-4 Atlanta 30-11/1 Denver 30-11/1 New York	6-8 Dallas 13-15 San Diego 27-29 Chicago
Structured Analysis	2	\$325	5-6 Phoenix 5-6 Atlanta	2-3 Denver 2-3 New York 9-10 Dallas 16-17 San Diego 30-12/1 Chicago 6-10 St. Louis
Structured Analysis/Design Workshop	5	\$625	9-13 Seattle 16-20 Boston 30-11/3 Kansas City	6-10 St. Louis 13-17 New York 27-12/1 Toronto
Structured Design/ Programming Workshop	5	\$625	2-6 Minneapolis 9-13 Denver 16-20 Washington, DC 30-11/3 Cleveland	6-10 Phoenix 13-17 Boston 27-12/1 San Francisco
Structured Programming for COBOL Programmers	2	\$325	12-13 Pittsburgh 12-13 Kansas City	20-21 New York
Structured Programming for PL/I Programmers	2	\$325	25-26 Los Angeles	20-21 Chicago
Infotech/Jackson Design Technology Workshop	51/2*	\$800	9-14 San Francisco	13-18 Washington, DC
Data Base Package Analysis and Selection	3.	\$475	16-18 Chicago	6-8 Washington, DC
IMS/VS Data Base Design	5	\$625	30-11/3 New York	27-12/1 Boston
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Data Base in a Distributed Processing Environment	2	\$325	16-17 Dallas	6-7 Washington, DC
Data Base Management Systems for Minis A Comparative Analysis	3	\$475	18-20 Dallas	8-10 Washington, DC
Systems Design in a Data Base Environment	2	\$325	30-31 Boston	13-14 San Francisco
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& Data Base Management Sys Systems Design in a Data Base E	tems for	Minis.		625

### In-House Policy

Structured Methods offers all of its courses on an inhouse basis. Furthermore, we are able to tailor any course to meet a client's specific needs. For more information, call us. We will be happy to provide you with prices, references, and scheduling information.

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### Operates Alone or as Slave

### Single-Board CPU Controls Communications

SANTA CLARA, Calif. — Intel Corp. has introduced the ISBC 544 intelligent communications controller, a singleboard CPU designed to serve in a variety of data communications capacities.

The ISBC 544 can operate as a stand-alone communications controller, concentrator or message switcher to terminal and other peripheral control-

lers, the firm said, and can also act as an "intelligent slave" to other single-board systems.

With this product, equipment manufacturers can dedicate communications tasks to a single-board intelligent controller, rather than employ subsystems comprised of several conventional logic boards, the vendor stated.

As a stand-alone, "dumb"

Tab's

**Mini-Handlers** 

make

**Man-Handlers** 

terminal handler, the ISBC 544 can reportedly be programmed to provide data link control and data buffering to each terminal and can also accommodate code conversions and interterminal protocol.

If the controller is used as a stand-alone system, its memory and I/O capabilities may be expanded and additional functions added using Intelcompatible expansion boards. Memory capacity may be in-

Memory capacity may be increased by adding user-specified combinations of random-access memory (RAM) and electronically programmable read-only memory boards. Multiple ISBC 544 boards may be included in a configuration where one ISBC 544 acts as a communications processor and the other boards

serve as intelligent slaves, Intel noted.

### As Intelligent Slave

As an intelligent slave, the product is said to incorporate on-board processing and dual-port memory capabilities to execute tasks that otherwise would be handled by the master processor. This approach is meant to free the master to perform other systems control and processing functions, thus simplifying systems software and reducing multiprocessing requirements.

On-board processing reportedly allows the intelligent slave to operate independently of the bus master. In this way, the ISBC 544 can locally control communications functions without accessing the system bus, the vendor continued, adding this minimizes the bus traffic devoted to communications, freeing the system bus for other system tasks

tasks.

The dual port RAM provides the interface between the ISBC 544 board and its master or masters, Intel said. The

memory allows both the onboard microprocessor and the masters to access the same memory block and can be used to transfer command and status information between

masters and slave.

The ISBC is a complete 8-bit CPU on a single 6.75-in. by 12-in. printed circuit board. Compatible with Intel's standard Multibus, the product contains four programmable synchronous/asynchronous serial I/O channels, an 8085A microprocessor, 16K bytes of dual port dynamic read/write memory and sockets for up to 8K bytes of read-only memory

The device also includes 10 programmable parallel I/O lines compatible with the Bell 801 automatic calling unit, four programmable bit/sec rate selectors, three independent programmable interval timers/counters and 12 levels of programmable interrupt control.

The unit also features extended system bus addressing for system access in partitioning a 1M-byte address space, Intel said.

(Continued on Page 54)







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### Remote Batch Terminals.

We offer the most sophisticated, flexible RBTs in the industry. Our 1600 family utilizes a communications operating system providing true mul-



HARRIS 1620 remote batch terminal.

tiprogramming capability. One large Harris 1600 can support up to four communications jobs concurrent with other tasks such as media conversion. The 1600 already supports virtually every communications protocol in wide commercial use today and will soon support full SNA capability. Communications interfaces are available up to 56 Kbps.



### Interactive Terminals.

Our interactive terminals give you features that you can't get elsewhere. Plus-compatible 3270-mode units in our 8000 series can be easily upgraded to offer local format storage, queued transaction handling, (and spooled print available soon). These features can be combined in any mix to improve efficiency and productivity at remote 3270 sites. Our software also allows the 8000 series to emulate



HARRIS 8000 series interactive termi-

Honeywell, Univac and Burroughs interactive protocols.



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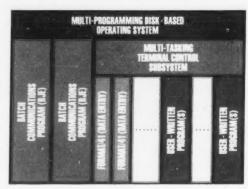
New HARRIS 1670 distributed processing system.

and interactive products into a single multi-function terminal. As a result, Harris systems can provide all five basic DDP functions concurrently: local or remote batch; data entry; local interaction and remote interaction. All of these functions operate under the control of sophisticated software providing flexibility normally found only on larger mainframes.



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### Datapoint Shows Infoswitch/ARC at TCA

(Continued from Page 41) dex Corp.; and three additional modems — two from Penril Corp. and the other from Paradyne Corp.

### **DP** Resources Applied

Elaborating further on the implications of their latest product announcement, Datapoint officials claimed that by fusing Infoswitch and ARC into a single offering, the company has made one of the first concerted efforts to apply DP resources to the problems of telecommunications management.

Like an unaided Infoswitch system, the combination product provides software modules that automatically determine least-cost routes for outgoing long distance calls, account for long distance and local toll call charges, centrally control telecommunications functions in up to eight remote locations, equally distribute calls among multiple phones and prepare assorted management reports.

In addition, the system runs user-written software as well as programs like Datapoint's Network Optymizer and its Equipment Billing or Directory packages, according to a company official.

Depending on the configuration, the Infoswitch/ARC system costs \$45,000 to \$500,000 from Datapoint at 9725 Datapoint Drive, San Antonio, Texas 78284.

### Racal-Milgo Debuts

Also at the conference, Racal-Milgo introduced its 24 LSI series modems, its loop modem series, the Com-Link III modem, Model 185 network diagnostic controller and NCM-7 network control module.

The 24 LSI modem series consists of the desk-top 24 LSI Mark II and the rack-mountable CS 24 LSI Mark II, both of which operate at 2,400 bit/sec over two-wire dial-up lines or four-wire, point-to-point and multipoint lines, a Racal-Milgo source said.

The company's Loop Modem series also consists of two members — the 1,200 bit/sec 12 LMS and the 2,400 bit/sec 24 LMS, both of which replace the IBM 3603 terminal access unit.

By contrast, the firm's other

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modem introduction, the Com-Link III, operates at 1,200 to 19.2k bit/sec over dedicated four-write metallic lines and transmits data up to 25 miles, the spokesman added.

Racal-Milgo's Model 185 network diagnostic controller remotely monitors, reconfigures and diagnoses IBM 3600-type loop systems, while the NCM-7 network control module allows users to monitor modem status from a remote site.

Depending on the features specified, the 24 LSI series costs \$900 to \$1,400; the Loop Modem series, about \$2,000; the Model 185, about \$10,000; the NCM-7, \$1,300 to \$1,500; and a basic Com-Link III, slightly less than \$1,000.

### **Modem Unveilings**

Some of the other modems introduced at the conference

included Paradyne's LSI 2400A, which transmits up to 2,400 bit/sec in multipoint and point-to-point networks; Penril's 9600 data modem, which operates at up to 9,600 bit/sec in a full-duplex mode, and its 4800 DCMM, which operates synchronously at 4,800 bit/sec; and General Datacomm's GDC 208-9A microprocessor-based unit, which transmits up to 4,800 bit/sec over point-to-point or

multipoint lines.

Penril's 9,600 bit/sec modem costs \$6,500, while the 4,800 bit/sec model costs \$2,900 for a standard version, \$3,500 for a remote diagnostic version and \$4,200 for a master diagnostic version.

Paradyne's LSI 2400A costs \$1,100, while General Datacomm's GDC 208-9A, TDM 1240 and TDM 1241 are priced at \$3,000, \$1,500 and \$3,500, respectively.



### First in the Nation

HONOLULU — The Hawaiian Telephone Co. has become the only U.S. phone company to provide interconnection with the Telenet Communications Corp. public packet-switched data network.

By installing a Terminal Interface Processor (TIP), local users can access by telephone any host CPU on Telenet, according to David Horton, director of computer communications development at Hawaiian Telephone.

The Telenet link to the mainland consists of two 9,600 bit/sec cable facilities, which will be upgraded as traffic grows. There are

currently about 20 users from the tourist industry, universities, the state government, banks and other sectors, Horton said.

The TIP was purchased from Telenet to give the phone company additional capacity for other network services. While interconnection with Telenet may seem rather daring for a U.S. phone company, Horton said, his firm would consider connections with other public data nets — such as Tymnet — depending on user demands.

He also did not rule out links with comparable Bell System offerings, including the Advanced Communications Service.

### Hawaiian Islands Linked With Public Network

(Continued from Page 41) asynchronous terminals at speeds ranging from 110- to 1,200 bit/sec, while synchronous equipment will be supported at 2,400- through 9,600 bit/sec.

Although final tariffs have not yet been filed, Okinaka said a savings of up to 30% could be expected by some users. Intrastate users between the islands of Oahu and Maui. for example, now pay about \$230/mo for 300 bit/sec private-line service. Dasnet II rates are expected to be nearly one-third less, Okinaka said.

### **Packet-Switching Possibility**

Initially, Dasnet II will offer only circuit-switched service, according to Horton, who played a major role in implementing Bell Canada's packet-switched network, Datapac.

Central switching equipment at the network control center in Honolulu, however will be an M3200 hybrid system from Computer Transmission Corp. It can be upgraded to packetswitched operation in the future, Horton noted. Dasnet II will be a lower cost alternative for many communications users, but some will continue to require private lines, he added.

The network will accommodate all RS-232 compatible equipment, Western Electric Co. modems or comparable data sets and GTE communications products, he continued, noting that Hawaiian Telephone is a GTE affiliate.

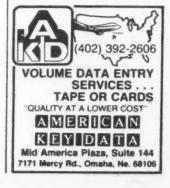
Horton said the phone company will market a wide range of terminals for use on the network, including Lear-Siegler, Inc., General Electric Co. and Teletype Corp. models.

Real-time trouble reporting and on-line network reconfiguration will be undertaken to minimize downtime, Okinaka said. "Fully itemized" network billing and usage statistics will also be furnished when needed.

The time-division multiplexing equipment that will be installed at major island facilities is now being tested at the Honolulu center. After this phase, the multiplexing equipment will be installed at the remote sites for further testing.



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to take your data Model 745 with you wherever you go, the 765 Portable Bubble Memory Terminal is ready, willing and able to allow you to enter it in common English terms, store it, then edit it at your convenience.

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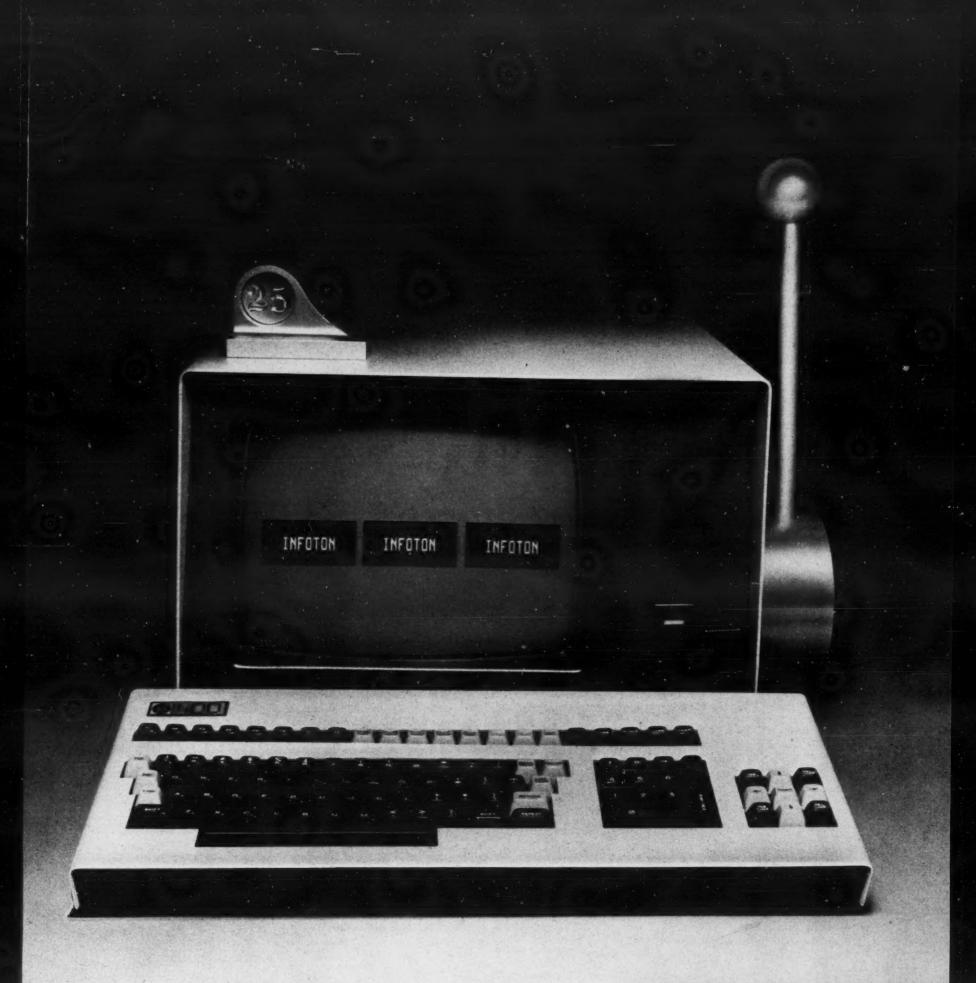
To find out how quiet they can be on the subject, contact your nearest TI sales office, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016.

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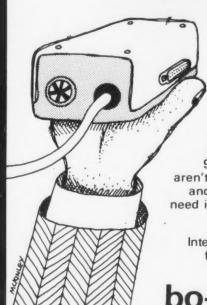
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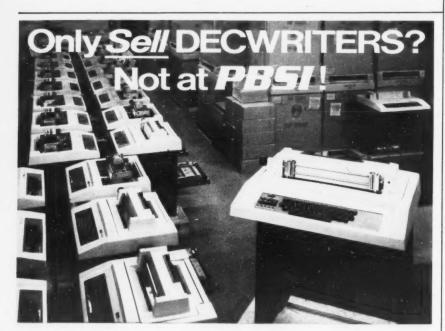
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### RCA Links U.S., Singapore

NEW YORK - Public data communications between the U.S. and Singapore is now available from RCA Global Communications, Inc.

The service will allow such Singapore industries as banking, shipping, engineering and travel, as well as educational institutions, to access data bases in the U.S. It will also provide a low-cost alternative for multinational corporations to transmit data between U.S. home offices and Singapore affiliates, a spokesman claimed.

Asynchronous transmission at speeds up to 1,200 bit/sec and synchronous transmission at speeds up to 9,600 bit/sec are supported.

U.S. customers can obtain access through the conventional telephone network, value-added carriers such as Tymnet or Telenet and through specialized common carriers, the spokesman explained.

Customers may also interconnect directly with the recently introduced RCA Globcom International Data Exchange in the New York

The service is usage-sensitive, which means that customers pay according to how much they use the service. The cost from the U.S. is \$12/hour plus 60 cents for each kilocharacter transmitted.

From Singapore, the rate in Singapore dollars is \$30/hour plus \$1.50 per kilocharacter. The U.S. dollar is currently exchanged at the rate of approximately one for every 2.3 Singapore dollars.

RCA Global Communications, Inc. is at 60 Broad St., New York,

### Old Song Gets New Verse

(Continued from Page 42) drivers' handwriting on the invoices was impossible to read. That meant tracking them down for verification which could take several days if they were on the road.

We began to recognize that we were missing some cash flow opportunities because the turnaround time was up to two weeks just to get them out. Then we had disputes with customers since our error rate was high because of the poor handwriting and other resulting inefficiencies of our manual system,' Garrett added.

### 'Disaster From Start'

The telecopier network "was disaster from the start," Garrett said. "Drivers turned in their bills of lading daily, but we did not get the correct information any sooner. The billing information was then transferred to telecopier forms. Errors began in that transferral process because often the data was not copied correctly.

And we had incredible transmission problems," Garrett recalled, "and on top of all that, the copy we received was often unreadable because of poor print quality. Between the poor telephone service, illegible copy and transmission problems, things got worse.

Our error rate reached the point of embarrassment," he continued. "Suppliers got very irate and questioned almost every invoice we sent, and in many cases with good reason."

Invoicing procedures got so much worse that less than a year after installation, the telecopiers were removed and FS reverted to the manual mailing system while further investigating alternatives

We realized there is just not enough data out there to warrant an on-line system," he said. "We sent out a request for proposals for an intelligent off-line distributed network and narrowed our choices down to five ven-

Garrett said FS selected MDS' Series 21 because of its easy implementation and operation, price and familiarity with the vendor's service record, which was a major consideration because of the remote terminal locations.

'All we had to do was specify the size and location of the record fields for our applications," Garrett said, "and that was completed in two days with the

help of an outside programmer.

After our data entry formats were written, one outside programmer worked with us, and using [the Mohawk Business-Oriented Language], the validations and range checks we required were added. That took about four weeks.

'And I am still impressed that MDS was able to meet the two-month time schedule we set up for equipment delivery," he said.

The MDS equipment is used for fuel and fertilizer invoice processing, the only goods handled at the dispatch stations. Bills of lading are keyed during the day and each dispatch station, via dial-up telephone lines, transmits the data to the central Series 21 site in three minutes vs. the eight-hour online telephone connect time the on-line system would require.

### **Batches 99% Correct**

The editing powers of the Series 21 here include a wide range of variance checks and batch totaling. "Each recieved batch is 99% correct," Garrett said. "Operators at the terminals key in the data, the terminal then crosschecks the load size to gross and net gallons. Batch totals are then crosschecked with bills of lading and customers to make sure the correct customer will be billed.

"This increase in efficiency has enabled us to turn invoices over to accounts receivable in two days, instead of the five to 11 days we were previously experiencing," Garrett said.

The system has been reliable, he added, noting that when the equipment has gone down, MDS service representatives reached the remote locations promptly.

We were previously familiar with MDS' service record because we used its key-to-tape equipment," he said. The only problems with the Series 21 have been occasional bugs, and the service men were there promptly."

At present, FS is not planning any future upgrades. "For the first time we are processing invoices quickly and accurately from the dispatch sites," Garrett said. "Invoices are being turned around in two days with 99 percent accuracy. It is a great relief not to depend on the mails and phone companies

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### Four Firmware Packages Enhance Dataroyal Printing System Line

NASHUA, N.H. — Four firmware packages said to allow both serial and parallel models of the Dataroyal, Inc. IPS-7000 series of intelligent printing systems to operate at up to 200 char./sec have been announced by the vendor.

The firmware packages represent four IPS-7000 configurations: the IPS-7018 and IPS-7019 parallel interface printers and the IPS-7218 and IPS-7219 serial teletypewriter-compatible printers.

### Ascii Set

All four models print a 96-character Ascii set in 7 by 7 dot matrix. The models 7018 and 7218 feature a 500-char. circular buffer, and the models 7019 and 7219 offer a

3,500-char. buffer, a Dataroyal souce said.

Dataroyral IPS-7000 series intelligent printing systems combine a matrix printer with an 8-bit microcomputer supporting random-access memory and programmable readonly memory (Prom). Earlier IPS-7000 models combine that microcomptuer with a 120 char./sec matrix printer, the source explained.

### Replaceable Prom

The microcomputer architecture of the IPS-7000 series allows the performance characteristics of any series model to be altered simply by replacement of Prom chips, such as those in the just-announced firmware packages as well as

others introduced earlier this

The basic IPS-7000 can operate in receive-only or key-board send/receive modes at a variety of speeds and, with firmware alterations, can handle other specialized applications, according to a Dataroyal spokesman.

### **Vertical Control**

Additional features of all four models include programmable vertical format control, which allows operator-selectable printing of either six or eight line/in.; an audible alarm, which alerts operators when problem conditions exist; and a self-test switch, which can aid in fault diagnosis

The IPS-7018 serial and IPS-7218 parallel interface models are priced at \$2,230 for OEMs and \$2,410 for end users in single-unit quantities. IPS-7019 serial and IPS-7219 parallel models cost \$2,280 for OEMs and \$2,425 for end

Deliveries are 30 days after receipt of order, Dataroyral said from Main Dunstable Road, Nashua, N.H. 03060.

### Report Recaps Opinions On SNA/SDLC

SAN JOSE, Calif. — A report on IBM's Systems Network Architecture (SNA) and Synchronous Data Link Control (SDLC) derived from the experiences of IBM mainframe users is available from SBS Publishing.

Entitled SNA/SDLC: Evaluation, Impact and Strategic Issues, the report draws its conclusions from more than 200 responses to a mailed survey directed at more than 2,500 IBM 360/370 sites.

This material was reportedly supplemented by the opinions of "senior-level DP executives" who attended SBS Publishing's distributed DP (DDP) workshops and by research gathered for the publisher's two earlier reports, SNA: 30 Years of Experience and SNA: Survey and Analysis

The report also includes a complete explanation of SNA in terms of its composition, intentions and relative place in the overall IBM strategy for maintaining control of its DDP accounts, the publisher asserted.

"While some of the user-perceived benefits [from SNA] center on the ability to maintain a centralized data processing approach to improve network control and discipline, the counterpoint benefits are also noted," SBS Publishing continued.

User-reported disadvantages of SNA/SDLC are also reviewed in the report, including problems associated with 360 application software as well as the Basic Terminal Access Method and Queued Teleprocessing Access Method.

Further, SNA/SDLC and its impact on the total network is evaluated form the perspective of overall network performance as the central goal, the publisher continued. A "blueprint for estimating conversion costs" is said to be included along with "detailed criteria for evaluations of alternative aproaches to SNA," ranging from DDP to devices intended to optimize the mainframe workload.

The report costs \$750 from SBS Publishing at Suite 190, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

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### Controller Plays Various Roles

(Continued from Page 46)
The ISBC 544 interrupt scheme accommodates interrupts from up to 21 sources, the vendor continued. Four interrupt levels are handled directly by the 8085A and eight interrupts are serviced by an Intel 8259 programmable interrupt controller.

### Flag Interrupt

The product features a flag interrupt capability generated from the dual-port memory. The flag interrupt is set whenever a bus master writes information into the base address of the dual-port RAM and is cleared when the on-board microprocessor reads from that address, Intel explained.

Thus, using a single instruction, the master CPU can interrupt the intelligent slave Clara, Calif. 95051.

and establish a communications sequence, the vendor said.

The ISBC 544 intelligent communications controller costs \$1,545 from Intel at 3065 Bowers Ave., Santa Clara Calif, 95051.

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### Part of 8100 Announcement

### IBM Introduces Office and Plant Systems

By E. Drake Lundell Jr.

CW Staff

WHITE PLAINS, N.Y. - Buried within IBM's recent 8100 unveiling [CW, Oct. 9] were two other product announcements an office communications system and an interactive plant communications system.

The IBM 3730 distributed office communications system puts IBM's Data Processing Division firmly in the word processing and text editing marketplace. The 3630 plant system includes a family of data input and output devices designed specifically for industrial sites.

Both systems run in IBM 370 environments.

Supported by new models of the IBM 3791 controller, the 3730 was designed to be linked to a host 370. It can perform data processing as well as text editing

However, the system can also be operated in stand-alone mode for both types of applications.

The latest 3791 controllers can support up to 16 devices in one

3730 system, including up to 12 IBM 3732 text display stations and as many as eight IBM 3736 bidirectional printers, depending on the mix of the two units, IBM

Users can employ the system for text applications which they themselves to create tailored letters, reports and manuals from text previously stored within the system, a spokesman

Furthermore, when two or more 3730s are combined with a 370, terminals in one office system can be used to distribute information to other systems in an electronic mail type of application, according to IBM.

The system will be initially marketed in New York, Chicago, Los Angeles, San Francisco, Dal-Boston and Washington, D.C., IBM said, because those cities have education and support centers for training on the sys-

Purchase prices for the 3791 controllers, with disk storage ranging from 5.5M to 24.1M



Plant employee uses IBM 3641 terminal to input data.

bytes, range from \$32,660 to \$44,860. Rental prices range from \$1,159/mo to \$1,510/mo; the system can be leased on a two-year plan for \$986/mo to \$1,285/mo.

The purchase price for the 3732

text display station with keyboard is \$3,325; it can be rented for \$112/mo or leased for \$95/mo.

The 3736 bidirectional, char./sec printer is available for purchase at \$7,445. It can be rented for \$250/mo or leased for \$213/mo.

First customer deliveries for the stand-alone system will be in the first quarter of 1979, while systems designed for host attachment will not be available until the first quarter of 1980.

### One-Day Delivery Achieved

### For Danes, DP Means Quick Mail

By Howard A. Karten CW Staff

COPENHAGEN, Denmark -The land of blonds and smorgasbords has recently demonstrated another good idea: the use of computers to help speed mail delivery.

Every day approximately 2.9 million pieces of mail - a tiny amount compared with mail volume in the U.S. - come into the Danish Post and Telegraph Sorting Office, a 16-acre building here. The service - one of the few postal services in the world to provide figures on mail delivery - promises that 95% of all letters received by 5 p.m. will be in the addressee's hands the following day.

To help achieve this impressive feat, the system uses computers to control the operation of mail sorting and transportation equipment within the central fa-cility. The computer's 10 Control Data Corp. System 17s ranging in size from 56K to 96K bytes - are configured into five dual systems that operate around the clock. To do so, they are serviced

by CDC personnel on-site. Each of the five pairs handles a particular mail-handling function, such as determining the drop point for incoming mail bags going to electronic, sorting, machines or directing trays of letters to certain areas of the

building representing geographic locations in Denmark.

### **Custom-Built Facility**

The facility housing the computers and mail-handling equipment was built with the installation of the computers in mind, according to Otto Vinter, project leader of the effort for CDC. Not only was it designed to handle the computers, but to handle substantial increases in volume. as well.

used was selected after bids were submitted by all the major mainframe manufacturers, according or 500K-byte diskette, while the to a CDC spokesman. The ability 3632 has either 5.2M or 9.2M

(Continued on Page 57)

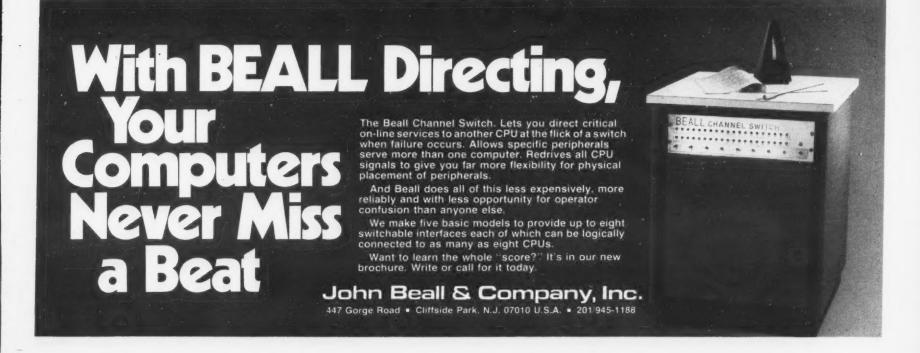
### **Plant System**

The IBM 3630 plant system has been available previously on a limited marketing program, but is now being released generally.

It is supported either by the 8100 information system or IBM 370 processors, the firm said.

The family of devices includes: .• The 3631 and 3632 program-... mable controllers, which com-The CDC equipment being municate between the system's terminals and the 8100 or 370 host. The 3631 has either a 250K

(Continued on Page 57)



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### Storage Hierarchy Trends - Part 1

### Glance at the Past Eases Planning for the Future

By George Rose Special to CW

Over the last decade, the on-line storage hierarchy for large computer systems has expanded. The growth in

data storage has been influenced by many factors.

As far as the future is concerned, it seems the requirement for larger capacity storage is open-ended. A diagram of the hierarchy, its boundaries and growth direction is shown in Fig-

While technology has served to increase the hierarchy's size, it has also fostered the kinds of problems that are typical of rapid change in a complex environment. A look at past developments and trends can provide a reasonable perspective with which to view the future.

A recognition of the way in which the hierarchy has changed can be useful for planning purposes, avoiding miscalculations which can be costly

and difficult to change. Not many years ago, a great deal of programming emphasis was placed on the efficient use of a limited, expensive resource - core storage. In today's environment, hindsight allows us to view those efforts as irrelevant to the present hierarchy.

Core storage has been replaced by semiconductor storage - typically, tripled in size - and the resource is now managed by a virtual storage operating system.

Magnetics was the technology on which the hierarchy was built, and it is still a dominant factor. Improvements in magnetics have been more in the nature of refinement than innovation.

However, the refinements have continually enhanced the viability of products based on magnetic technology and, conversely, have made it dif-

### For Danes, DP Hastens Mail

(Continued from Page 55)

of the local CDC organization to handle the 30 man-year project that resulted, is said to have been the key criterion in selecting the Minneapolisbased company's equipment.

The real-time systems include operator communications functions to control the mechanical equipment. Operators in the facility can issue commands to do such things as start or stop various equipment or change sorting tables

### Serial Loop

Since the number of measuring and control signals involved (1,000 conveyers, each with six signals, plus other mail-handling machines ) was so large, a direct digital interface was not possible. Instead, engineers designed a serial transmission loop with individually addressable control terminals.

This makes the software unusabl elsewhere unless the same terminal loop is used, Vinter noted.

The major benefits of the system are the maintenance of a one-day turnaround and the fact that the number of people required to handle the mail will not have to increase for several years," Vinter concluded.

ficult for other technologies to penetrate the market.

In the early 1970s, the semiconductor replacement of core storage became the first new technology to supplant magnetics in a major segment of the hierarchy. Main storage has dramatically increased in size and speed, and de-

This week Rose, a senior member of the Information Systems Staff at Western Electric Co. in Greensboro, N.C., takes a look at past trends in storage technology. Next week, in the final half of this series, he will predict future developments in the industry.

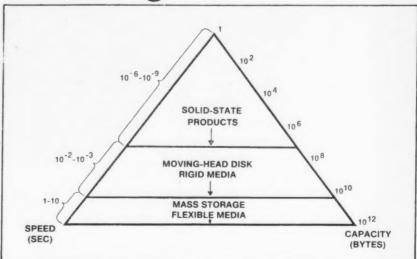
creased in cost, through semiconductor technology.

Having already surpassed ferrite core memory, the performance characteristics and economics of semiconductor random-access memories (RAM) have continued to improve to the point where they are approaching a competitive position relative to electromechanical head/track disk

In addition, two other solid-state devices, which are serially accessed and fabricated using techniques similar to those in the semiconductor industry. are being widely projected as candidates to fill the access gap between main storage (10 sec to 6 sec) and moving-head disk (10 sec to 3 sec). Charge-coupled devices (CCD) and magnetic bubble memory (MBM) are already being used in products unrelated to the large system hierarchy.

Continued improvements in component density and performance will help these devices to follow semiconductor RAMs in carving a niche. Memorex Corp. has announced a CCD cache product for disk subsystems and, undoubtedly, it will be followed by other vendors.

Figure 2 indicates the relative position of these solid-state products and magnetically recorded disks from a cost/time perspective.



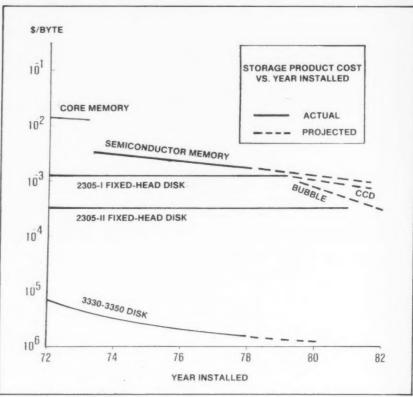


Figure 1 (top) illustrates storage hierarchies in terms of speed and capacity, while Figure 2 shows the cost of different types of storage as a function of the year in which each was introduced.

### IBM Adds Office and Plant Systems

(Continued from Page 55) bytes of disk storage as well as a 500Kbyte diskette.

The 3641 reporting terminals, which have 22-char. alphanumeric displays and use either a 35-key numeric or 70-key alphanumeric keyboard. An optional magnetic reader attachment is available

• The 3642 magnetic stripe encoder printer, in two models. The unit accepts hand-inserted documents and prints up to 10 lines or encodes magnetic stripes on, for example, inventory control labels. It features an alphanumeric 48-char., print set and a magnetically encoded 63-char.set.

• The 3643 interactive CRT terminal, nodels 2, 3 and 4, which have display sizes for 240-, 480- and 1,024 char. respectively. It offers either a 74- or 94-char. keyboard. The unit uses a gas panel display.

• The 3644 automatic data unit, which combines analog and digital I/O capabilities. The unit can link sensors, small computers, production status in-

dicators, actuators and test and other instruments, IBM said.

• The 3645 document printer. The device can be used to generate special operator messages, such as the need to reorder a part, or reports on finished jobs or quality control tests.

• The 3646 scanner control unit, which permits attachment of up to four magnetic readers for checking job status or recording the use of parts.

 A number of magnetic readers – both hand-held and slot type reading magnetically encoded tags, documents, labels and badges. The readers attach by coiled or straight extension cables to the 3641 and 3643 terminals or the 3646 scanner control unit and have visible and audible signals to alert users to the status of scanned data.

### Loop Technology

The 3630 system uses loop communications technology to attach both local and remote terminals to the system. Two local 9,600 bit/sec loops up to two miles in length are available; terminals more than two miles away use a 3842 loop control unit and teleprocessing facilities to hook up to the system.

These loops can be attached to either the 3630 controller or to an 8100 system, IBM said. When supported by the 8100, the system can reportedly be integrated into a distributed processing system through the use of Systems Network Architecture.

Terminals in the plant communications system can be supported by program products available for the 8100, IBM said. The system can be linked directly or through an 8100 to IBM 370s operating under DOS/VS, OS/VS1 or

OS/VS2 MVS.

A "representative" system including a 3631 controller, six 3641 terminals with attached scanners, two 3643 CRT terminals, two 3642 encoder printers and a 3645 printer will cost \$92,658. It can be leased for a monthly charge of \$3,058 under a two-year contract for the controller and five-year leases for the other devices.



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### Manufacturer Puts Technology to Work to Curb

are the bane of every manufacturer's existence, but one - a maker of navigational control systems here - is using computers to make cost estimating faster and more accurate.

Using technology - computers - to solve problems created by technology - the sophistication of aircraft subsystems - cost estimators at the Flight Systems Division of the Bendix Corp.'s Aerospace-Electronics Group are working with an in-house IBM 370/158 to get as quick and accurate an estimate as possible. In addition to these benefits, the system makes it easier to incorporate subsequent iterations and modifications to a proposal.

The system represents the latest step in an ongoing process. Previous efforts

have been made by manual preparation and calculation, a small office computer and an outside service bureau. By moving in-house from the service bureau, the division said it saved \$250,000 and increased produc-

With the manual system, a cost estimator — usually an engineer — had to contact all the departments involved in turning out an end product. This meant collecting labor and material costs, making computations for each item based on quantity, adding overhead costs, rechecking and so forth.

Since one estimate might contain 300 or more items, all elements of the task - data collection, cross-checking of totals, typing the appropriate forms and so on - were arduous, error-prone and

difficult to modify. The division presently works on about 150 jobs concurrently, with 2,000 documents passing through the division weekly, so the magnitude of the task was tremen-

### **Present System**

The present system, running under IBM's Time Sharing Option (TSO), has cost estimators writing programs in VS Basic, an IBM program product. We have found this situation ideal for us," according to Will E. Frey, manager of cost estimating for the Flight Systems Division. "The complexity of our computations would have made it difficult to convey our requirements to a programmer unfamiliar with our costestimating procedures.

"With the guidance of our IBM systems engineer, we were able to operate satisfactorily within six months," he noted.

W.J. Aspatore, controller for the division, pointed out: "Our product line requires processing an extremely large number of customer bid requests. The interactive costing system allows us to respond to these requests, many of which require fast turnaround, in a timely manner.

The company adopted the system partly because of the language used and partly because the system works via terminal. "We didn't have to hire a programmer and, in fact, we never would have been allowed to hire a programmer" to work exclusively as a programmer, Frey stated. "Without this approach, we never would have progressed this far.'

One of the cost estimators studied the VS Basic language and wrote about 50 of the programs now in departmental use. Another cost estimator, George Vasilik, has taken over the department's programming duties and divides his time between cost estimat-

ing and programming.

### Most Difficult Estimate

The most difficult estimate to prepare is one for a "unit," which is a functionally complete assembly manufactured for individual performance or system application. For each item comprising the unit, labor and material costs must be itemized, recorded, extended, totaled and checked. In addition, appropriate overhead figures must be included.

"Preparing an estimate is a huge data entry job," Frey observed. "A cost estimator must enter hundreds of line items to be calculated separately by a costing formula.

"With our interactive system, as the cost estimator develops these numbers, he enters them directly into the system once. This eliminates separate data preparation and negates the need for logging by various groups," according to Frey. "At the same time, programmed checks catch most data entry errors immediately.

"Printing the tabular material, too, used to require large amounts of overtime to meet deadlines," Frey recalled. Now the computer generates it quickly."

### **Time Savers**

Bendix recently submitted a bid for a unit consisting of more than 300 individual items, each of which could be required in various quantities.

Under prior methods, Frey estimated that it would have taken about five man-days to prepare this estimate. With the interactive system, it was accomplished in a day: a half-day for data entry and three hours to print the supporting documents on the terminal.

Even more time is saved when a second run is needed, since it is not uncommon for management to ask for a revised estimate reflecting recommended changes.

Formerly this would have required an additional five man-days: with the present system, the cost estimator only needs to enter the required changes because the bulk of the data is contained in the system. In three hours, the new printout is generated in full detail.

(Continued on Page 61)

Inventory Order Entry Real Estate Tax Billings Personnel Time Reporting Meter Reading Billings Subscription Billings Magazine Address Changes **Proxy Tabulations** Credit Applications Subscription Renewals Voter Registration Auto Accident Reporting Price Changes Accounting Applications Direct Store Delivery And Many, Many More

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### Cost Overruns Caused by Technology Advances

(Continued from Page 60)

Thus the two runs which formerly would have taken 10 man-days are now accomplished in 10 hours. This has given Bendix a pronounced edge in the preparation of bids. Since management now receives the estimate several days rather than several hours before the bid is due, there is ample time to study the figures and make revisions.

### **Strong Point**

A strong point of the system is its ability to handle "what if" strategies, according to Frey. "We can try different numbers - shifting profit margins a little - to see the effect on the final numbers. In the same way, we can testthe economics of alternative manufacturing technologies to see, for example, if it would pay to invest in more printed circuit manufacturing equip-

The cost-estimating staff has decreased by four persons in the past two years but, since the introduction of this system, it is accomplishing its work in less time, despite additional assigned duties previously performed by other departments.

Overtime has been almost eliminated; formerly part of the staff worked a minimum of two or three Saturdays monthly. Round-the-clock work during bid preparations was not uncom-

"We are better able to provide service for our customers now," Frey remarked. "In the negotiating phase of a contract award, it is standard practice for the customer to go over the bid in detail, questioning the numbers and looking for opportunities to reduce the price.

"I recall an instance when negotiations were conducted by phone and an across-the-board percentage decrease was agreed upon," Frey said. "We were able to apply the adjustment via the terminal. While the customer was still on the phone, we were able to quote the revised estimate and subsequently mail him the supporting documenta-

### Meeting Government Regulations

The use of automated systems has been especially valuable in meeting regulations for cost-estimating forms for government bids. Recent legislation permits suppliers to be compensated for the use of their capital facilities, and the Flight Systems Division is

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now showing the "recovery of money" on the cost estimate form.

It was accomplished with relative ease as an additional computation and has resulted in more income for the corporation.

There are times when the estimator must make material costs adjustments according to the desired quantity. The principle of purchasing curves has been applied to a program which projects the cost of items bought in quantity increasing by specified intervals. Thus, the price advantage for items bought in quantity can be quoted to potential customers.

Lower operating costs make it economically feasible for the corporation to maintain manufacturing facilities for the Flight Systems Division in

Montrose, Pa. Requests for quotations involving this plant are reviewed in Teterboro, and the compilation of data is accomplished either in Teterboro or Montrose.

All data is then entered into the computer system at Teterboro.

### Additional Job

"Life cycle costing," a job previously completed outside the department, was recently taken on by the cost-estimating department. This requires estimating the ultimate cost of a unit to the customer - including not only the initial outlay - but costs or breakdowns, servicing and spare parts as

Data is gathered from other departments and applied to the appropriate

Prior to the cost-estimating department's involvement, each new job was calculated using as many as 15 equations for one bid. Now that it is being accomplished by computer, complex equations can be recorded and modified to suit any item entering

Frey is enthusiastic about the results of the system and looks forward to further innovations. "We are committed to future advances in a system that has served us so well," he remarked. We try to keep abreast of technological improvements as they appear so we can achieve maximum benefits from automating our cost-estimating proce-

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### Add-On Memory Cures Health Center Ills

CW Staff

PITTSBURGH, Pa. - An old New England maxim about innovation and change says, "Be not the first to try nor the last to buy." Like many maxims, it reflects truth borne of experience, and it is practiced in many DP installations, where stability of operation is often as important - if not more so than acquisition of the latest technological devices

Ignoring this conventional idea, the University Health center of Pittsburgh last year installed an add-on memory system it said was "probably the third or fourth one in the country," and the performance of the unit since it was installed has been "fantastic," according to David D. Libenson, director of the health center's data center.

Although Libenson said he was initially "apprehensive" of the large time block requested by Itel Corp. to install the 1.5M-byte Universal Memory System (UMS), he added that "from the day it was installed to today, it has never been down. Itel sent some people from the plant to install it and make sure things went properly.

The memory's uptime has been in excess of 98%, he estimated.

The Itel unit replaced an earlier addon memory the center acquired from Cambridge Memories, Inc. (CMI). Libenson explained that not only did he have serious and continuing problems with the previous unit, but they increased when the Bedford, Mass., firm underwent financial difficulties several

years ago and transferred its maintenance contracts to Raytheon Service Co., a subsidiary of Raytheon Co.

After CMI sold its field engineering division to Raytheon, we got extremely poor support - I'm not sure just whose fault it was, but the service was terrible," he said.

An example Libenson cited was an instance when the memory was malfunctioning, and he couldn't find anyone to fix it. "I called the regional manager at Raytheon and asked, 'How can I get someone to come down here and fix it? He replied 'You can't - tough." The manager employed by Raytheon left the company shortly thereafter, he noted.

Libenson explained in some length that the problem might not have been wasn't Raytheon's equipment.

'In addition," he continued, "there were engineering problems here. We had a field-upgraded Model 145, as opposed to a plant-manufactured system; as I recall, I was told a 145 Model 1 is not the same as a 145 Model 2, and these are not the same as a fieldupgraded Model 2.

The experience has not totally soured Libenson on Raytheon, however, since he is presently planning to buy a remote job entry system from the com-"I don't have a closed mind toward Raytheon or anyone else," he commented. "It was the company's attitude I couldn't deal with.

Libenson said he was able to learn something valuable from the experience. "The memory incident has led me to feel that the stability of the organization that sells me equipment is just as important as the product I'm buy-

"When I looked at Itel as a potential vendor, it was just as important to me that it was going to be in business for a period of time and be able to support me," he said.

The configuration in use at the health center includes an IBM 370/145 with 1.5M bytes of memory, running under OS/MVT. An on-line patient data base, containing patient histories, is accessed by approximately 40 IBM 3270 CRTs located in the admitting area, emergency room and outpatient

### **Medical Applications**

Medical and scientific applications running on the system include an ongoing study linking the health of newborns to the health practices of the mother, a system for doing radioimmunoassay calculations and a system used to enter the results of lab tests. In addition, the system sends out yearly notices to obstetrical/gynecological patients, reminding them of appointments for Pap smears.

Cost justification is always uppermost in Libenson's mind in looking for new applications. "For everything we do, there is a cost justification. The system has allowed management the opportunity of keeping costs down. Because of the quality of the service we provide, general management has the opportunity to implement strategies to save money.

Libenson is presently investigating the possibility of acquiring a system that checks for possible interactions among two or more drugs administered to patients. "But we will only acquire it if it is cost-effective," he explained.

The system is performing well, Libenson noted, and that has created a minor problem for him. He said that in the past year the system has averaged in excess of 97% uptime and added that he has had no unscheduled downtime in the past two months. "A year ago, people complained that the system was good, but it wasn't up enough. Now, people have gotten used to the system's being constantly available, except that the response time is a bit variable. People don't remember the immediate response [that they usually get] - that's what they have come to expect. Unfortunately, they remember the occasional half-minute response

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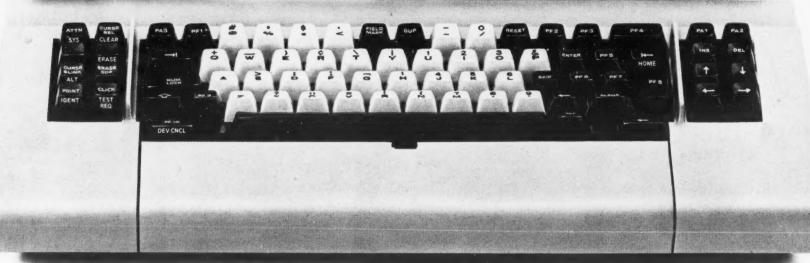
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A big factor in the 8100's ease of operation is the new IBM 8775 Display Station. It offers advanced functions such as reverse video, variable screen

capacity, division of the display in up to eight segments, field validation functions and operator guidance features.

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the new system can give your headquarters DP staff a window to monitor what's happening at any 8100 location, right from the central site. They can help out if someone needs programming assistance, or if difficulties crop up. And remote program maintenance can be greatly simplified.

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### Two 3033s Linked in Shared Disk Environment

CANOGA PARK, Calif. -Two IBM 3033 processors have been loosely linked here in a shared disk environment in what is claimed to be the most powerful commercially available system on the West Coast.

Mellonics Information Center, which handles processing for Litton Industries, its parent, as well as commercial customers, made the hookup when it installed its second

3033 at the end of August.

That system — an 8M-byte processor - joined an earlier 6M-byte 3033, which was installed in July, according to Nate Weaver, director of computer systems for the firm.

The systems both run MVS and are coupled through the use of JES-2, he said. Disks on the system include a mix of 3350s and 3330s, he added.

Installation of the two syswent "smoothly."

Weaver said, although the company experienced a few problems "that you would get with any system that had been shipped across the country."

However, these problems were "relatively minor" in that they could be "fixed quickly" by the IBM personnel assigned to the account, he said. Within a month of the sec-

ond 3033's installation, the situation was "stabilized," he

The two 3033s replaced Mellonics' earlier installation which consisted of an 8Mbyte 370/168 Attached Processor (AP) configuration and a 4M-byte 370/158 AP.

In early tests of the 3033s compared with the earlier units, Mellonics found that a single 3033 had "somewhat throughput" when compared to the 370/168 AP that had been installed.

However, the firm expects

the throughput to improve as it fine tunes its system and begins to use the MVS Systems Extensions from IBM. These could give a 15% to 20% performance boost, Weaver said.

The early tests were made running programs that had been operating on the 168 system without any modifications at all, he emphasized, adding that the modifications planned should make the 3033 look even better in comparison.

### **System Benefits**

Ease of maintenance and sys-

Mellonics was formed in

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Typically, TSO usage runs at about 100 terminals simultaneously, Weaver said, adding that the system runs 24 hours a day, seven days a week.

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tem reliability are two of the benefits expected with the 3033s, the latter having been demonstrated already as the first 3033 operated continuously for 10 days without an initial program load.

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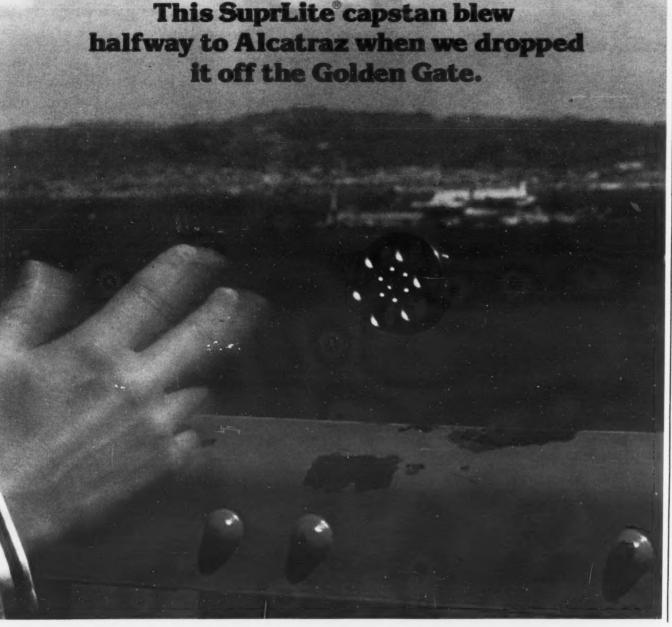
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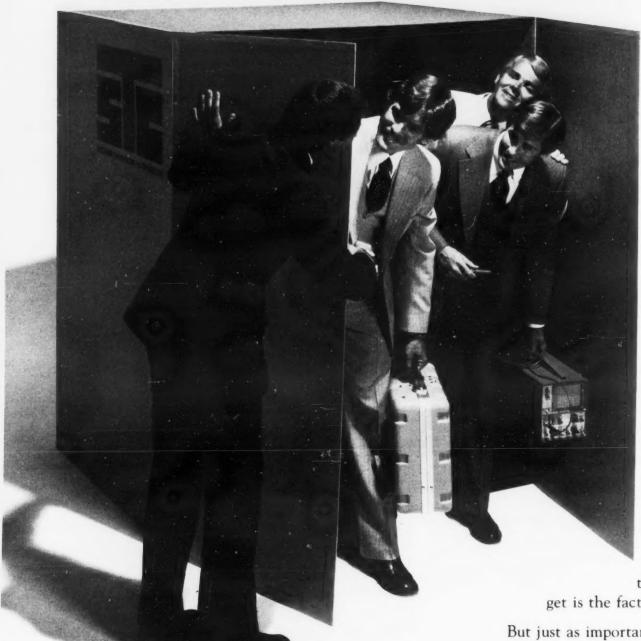
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### Service Bureau Trying Distributed Data Entry

ROLLING MEADOWS, Ill. — "Service bureaus as we know them today are going to disappear, probably within the next decade," according to Joe Carpenter, president of Carpenter Computer Services, Inc.

Carpenter's service bureau here handles processing for more than 40 firms, representing a variety of industries including construction, manufacturing, insurance, distribution, importing and retailing. And he thinks he has come up with a way of blending the power of computers, communications and distributed systems to provide a new service for his clients — one that will bring the concept of a centralized DP operation into the 1980s.

Carpenter has started placing data entry back in the customer's hands, while still providing the raw processing power traditionally offered by service bureaus. To carry out its plan, the company intends to keep its mainframe and put smaller, less expensive devices at each customer site. It has chosen Pertec Computer Corp.'s XL40 Distributed Processing Systems (DPS) for the customer sites.

Data entry is the single largest problem a service bureau faces, according to Derrell Gilstrap, a Carpenter vicepresident. While service bureau personnel are conscientious and welltrained, he feels they are generally not familiar with the specific data they input. If the user inputs the information, errors or inconsistencies will be detected quickly and corrected and the data entered will be more accurate.

"We've superimposed the distributed DP (DDP) philosophy on a service bureau operation," he explained. "With our system, the people who are now filling in forms and mailing them to us will simply key the data into a termi-

nal. As a result of this change in operation, the data will be cleaner, processing will be faster and applications will be enhanced."

One of the innovative uses to which Carpenter is putting his system is catching fraudulent users of the "cents-off" coupons food processing firms often run in newspapers.

In coupon fraud, retailers submit coupons without having purchased enough of the product for the number of coupons submitted, or else they cheat in other ways. "We have the names of 1,500 to 1,600 suspected fraudulent retailers in the system and can check them when we prepare the documents for input," he explained, "instead of doing a manual look-up on them, which is quite time-consuming."

### Manpower Needs Reduced

"Using the XL40 system, manpower requirements have gone from four people to one person. The other three are freed for more important work," Carpenter stated.

The service bureau plans to deliver turnkey systems to its customers complete with programs, storage, formats, communications and service.

Gilstrap does not foresee any problem with the variety of customers his firm services since the XL40's coding makes it a simple task to modify one data entry format to suit the needs of several users.

The primary advantages of this approach come from the XL40's processing power, he said. The system can automatically edit and verify data as it is input. Should an error occur, the user either knows the correct information or has immediate access to it and can initiate a correction. A typical service bureau usually flags an error for later

correction

Carpenter's plan, still in an early phase, would place an XL40 at each customer site. An average system would consist of three terminals, 96K bytes of memory, 10M bytes of disk storage, a printer and a communications capability.

Businesses with insufficient volume to justify an XL40 could install a smaller Pertec XL20, he noted. Or, for very low-volume applications, they could use an XL40 remote On-Line Subsystem consisting only of a CRT and/or printer configuration.

### **Cost Justification**

Gilstrap said an on-site processor would result in slightly higher monthly bills for the customer, but he explained the benefits would far outweigh the small additional charge.

A good portion of the cost justification will come from elimination of duplicate efforts, he pointed out. Today, customer personnel code the forms, which Carpenter personnel then enter.

The service bureau is currently running two eight-hour shifts of pure data entry. Under the new system, information will be handled only once.

Data accuracy will be increased, since the operators will only worry about their own source documents, not those of 40 other customers, and will not confuse formats or codes.

Restricted or sensitive data no longer has to be released to "outsiders." This data will be input at the customer's site by customer personnel, transmitted over telephone lines to Carpenter's mainframe, processed and retransmitted. This greatly reduces the possibility of theft or unintentional disclosure. It also speeds up response time as messenger and mail delays have been

eliminated

Local processing power and storage will also allow a customer to use this part of his files, approximately 20%, which are needed for daily work. The remainder can be batched for processing the next morning.

If a customer wishes to implement certain processing jobs on the XL40, Carpenter will support that idea, too. The service bureau can, for example, program certain applications on its own XL40 and download them to the customer's system.

"For most of our customers, we're a consulting firm first and a service bureau second, so we're not afraid of passing off business if our clients do some on their own," Gilstrap explained. In fact, Carpenter envisions some firms will use the XL40 as an intermediary step to acquiring their own system, in which case Carpenter would most likely remain as a consultant and provide services for heavy volume processing.

Gilstrap is confident that his firm's DDP approach will see it through the eventual demise of the "typical" service bureau.



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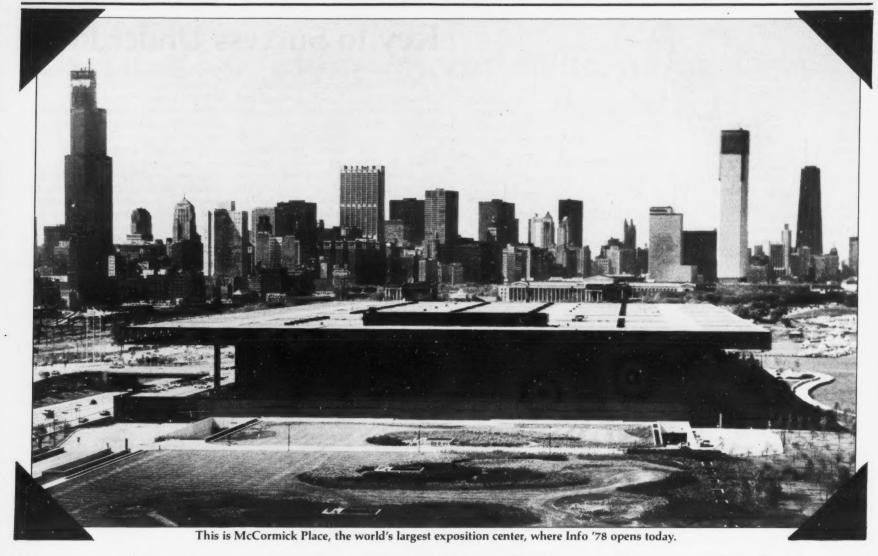
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### Info '78 Promises Wealth of Speakers, Exhibits

By Tim Scannell CW Staff

CHICAGO — Private eyes pay for it, telephone operators dispense it and today, here at McCormick Place, thousands of DP executives will discuss it.

The "It" is, of course, information — or, to be more precise the management of information as it relates to a company's DP operation.

More than 15,000 people are expected to attend the four-day Information Management Exposition & Conference (Info '78) which will feature over 200 speakers and exhibits by nearly every major mainframe manufacturer. The show's theme, "Strategic Planning in the Information Age," will cover everything from data and word processing systems to office automation. The focus of the show however, will be on the useful application of known and developing technologies, rather than on the technology itself.

"The purpose is to demonstrate how executives can make their operations more productive by improving existing information systems or creating new ones," a show spokesman explained.

The show, with its crowds and number of exhibitors, can be loosely compared to the National Computer Conference during its initial run in 1973. Since last year, Info has attracted an additional 70 exhibiting companies and increased its exhibit space from 44,000 square feet to 70,000 square feet, the spokesman noted.

The conference is broken down into three major areas, focusing on information management, information technology and office automation. In addition, several sessions will address problems and developments in electronic mail systems, data base applications, auditing, security management and hospital DP systems.

Info was inaugurated in 1974 as a replacement for the semiannual Spring and Fall Joint Computer Conferences; until this year, it was never a moneymaking proposition for show sponsors Clapp & Poliak, Inc.

The original program was structured by the American Management Associations, and the show's present planners have stayed with the four-yearold format of approaching DP from a management rather than a technological angle.

One noteworthy aspect of the show is that it draws a large number of exhibitors whose presence attracts interested and influential participants. The vendors "recognize us as a viable exposition with an attendance made up of the right people," Clapp & Poliak's

Richard Wolcott said.

Among this year's exhibitors are three which will be at Info for the first time. Hewlett-Packard Co., which reportedly hasn't exhibited at NCC for two years, Texas Instruments, Inc. and Quantor Corp.

NCR Corp. has expanded its booth space since last year from 300 feet to 1,500 feet. This demonstration of en-(Continued on Info/10)

Stieger, Fertig to Speak

### Key to Manager's Success Set for Probe

By Tim Scannell CW Staff

CHICAGO — Like the great teams of Lewis and Clark, Gilbert and Sullivan or Abercrombie and Fitch, information management and technology share an inseparable hand-to-hand relationship that is vital to the DP manager's success in the corporate world of the 1980s.

Management must adapt and change as DP technology becomes more sophisticated and complex or the entire system "chain" will be jeopardized. Tomorrow's DP manager must be able not only to respond to the various system changes and alterations, but to predict what these changes will be and how they will effect the entire corporate DP structure, according to William Stieger, a Standard Oil Co. hardware/software evaluation analyst. Stieger will address the problems of DP management and capacity planning this week at Info '78, a four-day information conference and exhibition scheduled to begin here at McCormick Place today. The conference will run through Thursday and focus on such areas as DP management, distributed data processing, data communications, I/O systems, data analysis, security management, office automation, electronic mail systems and small business equipment.

Capacity planning and development of a DP-oriented battle plan are possibly the two most important functions of the contemporary DP manager, Stieger explained. Unfortunately, far too many managers ride on the tide of new technological developments and increasing business activity, failing to acknowledge or prepare for upcoming system demands.

"If the DP manager plans in detail at all," Stieger said, "he's probably doing better than anybody else in the company."

Stieger's session, "Capacity Planning — A Necessary Component of DP Management," will deal with the DP executive's planning responsibilities as well as "the kinds of questions which arise in the course of using a [computer] system.

"How come things are slow?', 'How can we make things run faster?', 'Why

do we have to spend this much money?' — these are basically the questions that a DP manager gets from people who are not familiar with computing," Stieger pointed out.

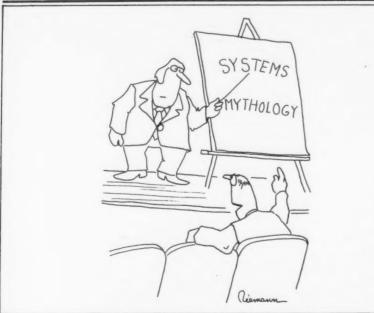
A manager's basic duty is to present the DP function to the rest of the corporation minus the technical jargon and mysterious acronyms.

Hopefully, the company will return the favor and extract corporate doublespeak when dealing with the DP department.

A DP manager should "simply sit down and write a story or a scenario stating that if the company does these things and has these administrative implications, then it can infer the following DP assumptions," Stieger believes.

### **Times Definitely Changing**

Technically, the times are definitely changing, according to Robert Fertig, vice-president of Advanced Computer Techniques Corp.'s Technology Analysis Group (TAG). The mainframe's basic architecture is quickly evolving (continued on Info/2)



'For the Last Time, Larkins, the Word Is Methodology.'

### **Key to Success Under Probe**

(Continued from Info/1)

from its well-known centralized systems and terminals — or to what is collectively known as the "distributed function," Fertig stated.

Fertig, a self-described "IBM-watcher," will discuss the merging trends in computer architecture and the impact IBM systems will have in the next decade. For instance, he noted, manufacturers today are increasingly concerned with a new machine's functions rather than its speed.

### User Concerns

Users are more interested in better reliability, availability, serviceability and ease of operation rather than "raw millions of instructions per second performance dollar," Fertig said.

IBM system architecture will also undergo some radical changes during the 1980s, Fertig observed.

The company's 30 series architecture is basically an enhancement of the 370 designs, which are based on the 360, and have been around for some 13 to 14 years.

Because all of the equipment is functionally the same, the bulk of the costs are spent on developing new software and support, Fertig said, generating a "price erosion trend."

"The price of IBM's hardware is dropping all the time while software and support costs rise," to the point where "very soon they'll be giving it away," Fertig claimed.

Fertig reportedly will outline 18 key challenges and potential restrictions which could inhibit IBM's growth in the 1980s and illustrate some possible

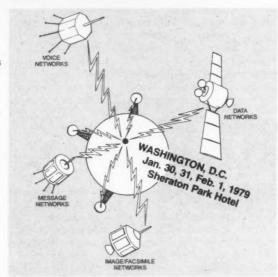
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Robert Fertig

solutions to the company's evolution-

If IBM reduced the need for complex job control language (JCL), automated all of its file-handling functions and demonstrated "effective" user productivity, Fertig suggested, the company might reverse inflationary software trends and, consequently, be able to charge more for its hardware in the future.

# Nitty-Gritty On Tickets, Show Hours

CHICAGO — Info '78 attendees can register at the door starting at 8 a.m. Monday morning, Oct. 16, for the four-day show.

A four-day ticket costs \$225, which includes admission to all sessions and the exhibit floor.

A one-day conference ticket costs \$80 and also covers admission to the floor and a half-day conference ticket is also available for \$45. Those who wish to visit only the exhibit floor will be charged \$5.

Exhibitors are distributing advance registration tickets to their customers that allow admission to the floor for \$1.

The exhibit floor is open from 11 a.m. until 5 p.m. daily except for Thursday, Oct. 19, when exhibitors will fold their tents and steal away at about 4:00.

The show will be on the street floor at McCormick Center, which is the top-most exhibit floor.

### User Needs Critical Eye

### No Time for 'Honeymoon' With Mini: CPA

By Tim Scannell CW Staff

CHICAGO - Management's corporate "honeymoon" with a new business minicomputer system should be less of a starry-eyed infatuation with the machine and more of a detailed inspection of the computerized partner.

The small business system does not, in effect, run itself," according to Richard Hoberman, a supervisor with the certified public accounting firm of Seidman & Seidman. "Once the system is in and the vendor has left, a user has to take stock and see what the weak points are and then try to plug whatever holes exist."

Hoberman will discuss the pros and cons of business/minicomputer relationships and highlight those areas that most often lead to user/machine divorce this week at the Info '78 conference. The four-day information extravaganza, together with an equipment exhibition presented by more than 200 vendors, is scheduled to run until Thursday, Oct. 19, here at Mc-Cormick Place.

Hoberman's early-morning session, focusing on what the minicomputer user should do after the system is plugged in, will address four key areas of user/computer relationships: The machine's impact upon the management staff and executive decisionmaking activities; the computer's effect on the employees; what potential problems to look for both inside and outside the system; and some important guidelines to follow before and after the minicomputer's installation.

### **Key Management Function**

Control of the minicomputer system, through effective systems planning and operational monitoring, is probably the most important management function, Hoberman stated. The first step on the road to control is to "thoroughly document" each department that is touched by the computer and clearly illustrate the informational pathways.

The best way to do this, he said, is to flowchart all paperwork and forms from "cradle to grave" or from the entry of each bit of information into the system until its exit.

Scattergraphs," or responsibility matrices indicating certain system applications and the employees who perform them, are also important to the final strength/weakness analysis. "Look for a nonsegregation of duties or a person who has too many functional controls," Hoberman said. In addition, "If a piece of paper is handled four, five or six times . . . it's conceivable you might want to reroute that information

There are a number of "red warning flags" that signal an ineffective or re-



'Our Group Therapy Session."

dundant minicomputer system, Hoberman pointed out. The first is the "one-man DP shop" where a single person is responsible for everything

Another signal is the "slaves-to-thecomputer syndrome" whereby the majority of the company's detail work is done outside the minicomputer sys-

Richard Hoberman is slated to discuss the pros and cons of small business minicomputers and highlight areas that most often lead to user-machine "divorce" on Tuesday morning, Oct. 17 at Info '78.

from flipping the computer's power tem. In this case, the computer is used switch to programming the machine. This person literally has the company at his mercy and can steal the firm-"blind," he said.

more as an editing and printing machine than as an information processor. Manually assisting the computer in calculation and accounting functions wreaks havoc with the system's auditability and seriously upsets internal control, Hoberman said.

And perhaps the greatest threat to system integrity and security is the "helpful software vendor" who rigs an auto-answer modem on a company's computer and proceeds to troubleshoot problems from his office.

The problem with this particular arrangement, Hoberman contended, is that it is an "open invitation to anyone with a terminal to mess with your system." Valuable customer lists or other privileged types of information become fair game to unauthorized users who know a system's telephone number or passwords.

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Session 16.6 page 27 Impact of Technology on the Banking Industry in the 1980's	Session 16.4 page 27 Systems Options for Trust Management and Trust Profitability Session 16.5 page 27 Trends in System Development for Inter- national Banking	Session 16.3 page 26 Office Automation in Commercial Banks	Session 16.1 page 26 Evaluation and Assessment of Distributed Data Processing in Banking Session 16.2 page 26 Management Information Reporting and Profitability Systems in Banking					CTURING BANKING
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### Session to Show How to Get 'Best Fit' Mini

By Tim Scannell CW Staff

CHICAGO — Far too many executives considering one type of minicomputer system in a veritable circus of offerings often fail to see beyond the "greasepaint" and settle for something more attractive than functional.

"The businessman has to have some understanding of what he's asking for," John Morris, principal of Morris Consulting, explained. "First, he should define his requirements, and in some general way he should have enough knowledge to be able to evaluate those requirements in terms of the demand they will eventually put on the system."

Morris will share his views on choosing and setting up a "no-nonsense," profitable and successful small business minicomputer system today at Info '78 — a four-day information and management event here at McCormick Place. The conference and exposition will cover a variety of management-related topics and is scheduled to run through Thursday.

Morris contends the opportunities for acquiring effective and easy-to-use systems are abundant but, contrary to most executive's belief, there are no shortcuts.

#### **Before Vendor Contact**

"The most important thing is for a businessman to sit down and define his own requirements without the aid of a computer firm coming in and telling him what he wants," Morris stated. A potential user should also have a firm understanding of the minicomputer's potential and, ideally, a written document highlighting his

### Despite Myth, Chicago Not Windiest City

CHICAGO — Those traveling here for Info '78 might like to know that the average temperature of this city in October is 54.5°F — 11° colder than September. But to dispel a popular myth, it it not the most windy city. That honor belongs to Sandberg, Calif., according to Robert Lautzenheiser, who heads the New England Climatic Service in Reading, Mass.

According to Lautzenheiser, Chicago is 67th out of 250 cities in 49 states, not including Alaska, for which the National Weather Service has maintained mean annual wind speeds for a long period of time.

The annual mean wind velocity in Chicago is only 10.4 miles per hour. Sandberg's is 15.4 miles per hour, he said.

The weather guru is a former state climatologist for the Department of Commerce's National Weather Service and still does work for that organization from time to time.

With a 1970 population of 3,369,359, Chicago is the second largest city in the U.S. — second only to New York.

In addition to its multimillion-dollar annual convention business, Chicago is known for being a major industrial, commercial and transportation center. Its airport — O'Hare — has been called the busiest in the world.

needs in relation to what the system can deliver. "Without a written document," Morris observed, "and with just a 'back-of-an-envelope'-type description," the typical businessman will undoubtedly get into trouble "going after a turnkey-type computer system."

Although there are a number of different systems and an even greater number of vendor claims about system power and flexibility, all minicomputer systems are basically the same, Morris said. "When somebody is looking at a system, the difference in the hardware might vary, but really not too much."

Hardware should be the least important user consideration when choosing a business minicomputer system, "which probably turns around what everyone else is thinking,." Morris claimed.

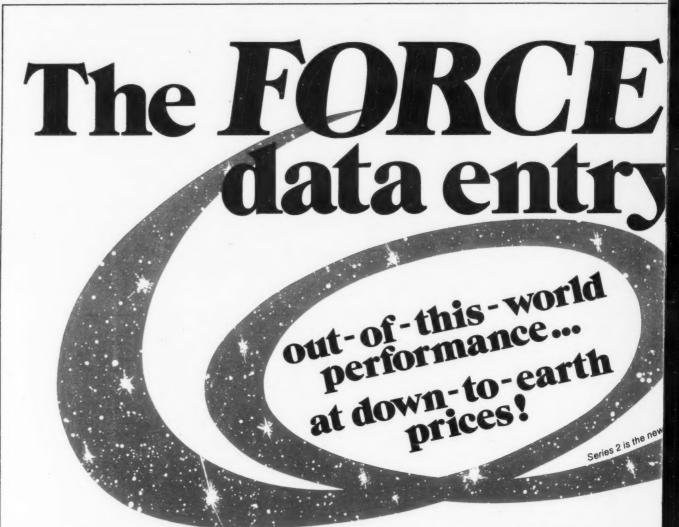
### 'Inverse-Priority' Approach

A potential small business user, constrained by limited funds and usually a limited knowledge of DP, should adopt an "inverse-priority" approach during the selection process. The types of application software available and how effectively it is written should be top priorities for scrutiny and hardware should be considered last, Morris noted.

"There are different approaches to application programs that can make a difference of 20 or 30 to 1," Morris remarked.

"I'm evaluating the guys that are doing the applications software first, seeing what type of packages they have, examining their approach and evaluating what type of quality they can produce. Then I worry about the operating system, making sure it's adequate and can handle the types of things I need for my specific jobs," Morris continued.

Morris's workshop, essentially "a three-day course condensed to three-hours," will cover six areas of minicomputer acquisitions and usage: defining the information requirements; estimating computer capacity requirements; evaluating the approaches and cost benefits; developing systems specifications; planning the transition to the new system and understanding people requirements; and setting guidelines for system implementation.



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### Museums, Zoos, a Planetarium . . .

### Playing Hooky? There's Plenty to Do in Chicago

CHICAGO — For those with a yen to play hooky for a day, this town is replete with things to do.

At the top of the list is The Art Institute of Chicago, a museum whose collection of impressionist paintings has few rivals. Located at Michigan and Adams, the institute also has a number of interesting temporary exhibits — "Theatrical Prints by Torii Masters," "The Athlete"; Ivan Albright; and "Pompeii AD 79."

Also on display are collections of quilts; Japanese prints and ceramics; French and Italian drawings; "The Rake's Progress" and "The Blue Guitar"; 17th Century Italian prints and drawings and "Drawings 1900-1976."

Museum hours are 10:30 a.m. until 4:30 p.m. Monday, Tuesday, Wednesday and Friday and 10:30 a.m. until 9 p.m. on Thursdays. Admission is free. On the weekend, there is a \$2 admission fee. For more information, the institute can be reached at 443-3500.

On a less aesthetic level, there's the Chicago Police Department at 1121 S. State St. that boasts the "world's most advanced" headquarters. Tours for 15 or more incude the communications center, crime lab and DP departments. Reservations are necessary. Telephone number there is 744-5574.

The Chicago Tribune, at 435 N.

Michigan Ave., gives tours of its printing plant, one of the largest in the world. Tours are Monday through Friday from 9:30 until 11 a.m. and 1:15 until 2:45 p.m.

Advance reservations are required. Contact the newspaper's public service office at 222-3993.

DPers interested in Frank Lloyd Wright can take a walking tour of Unity Temple and the exteriors of 13 Wright-designed residences in Oak Park. The tour leaves Unity Temple at 2 p.m. on Sundays and costs \$2. For more information telephone 326-1393.

Glessner House at 1800 S. Prairie is

an architectural landmark designed by Henry Hobson Richardson in 1885. It boasts a collection of Frank Lloyd Wright and Issac Scott furniture.

The building is open for tours every half hour on Tuesdays, Thursdays and Saturdays from 10 a.m. until 4 p.m. and 1 p.m. until 5 p.m. on Sundays. Admission is \$1 and the telephone number there is 326-1393.

Old Chicago, in Bolingbrook, Ill., is advised as "the world's only indoor amusement park and 1890s shopping towne." It has rides, an international circus, a laservisions light concert and a fun factory.

Old Chicago is open daily. Admission is \$5.75 for adults, \$4.75 for children. Group rates are offered. For more information telephone 759-1895.

The Chicago Academy of Sciences at 2001 N. Clark features a coal forest, a rain forest, tree trail to Indian dunes, a walk through a canyon and a walk through a cave. For more information call LI 9-0606.

The DuSable Museum of African American History at 740 E. 56th Place in Washington Park is open Tuesday through Friday, 10 a.m. until 4 p.m. and noon until 4 p.m. on Saturday and Sunday. Tours are by appointment and cost 50 cents. Telephone 947-0600.

The Field Museum of Natural History at Roosevelt Road at So. Lake Shore Drive is featuring an exhibit of "Nonmodern Moneys of the World," "Imperial China Photos" and a "Bugaku," a live Japanese music and dance performance, on Oct. 16.

Also to see there is a Pawnee earth lodge. Tours are 9 a.m. to 5 p.m. daily. Call 922-9410.

The International Museum of Surgical Science and Hall of Fame at 1524 Lake Shore Drive maintains an exhibit of surgery developments in three countries. It is open Tuesday through Sunday, 10 a.m. until 4 p.m. Telephone 642-3632.

The Museum of Contemporary Art, at 237 E. Ontario, is featuring "The Reborn Building: New Uses, Old Places." Telephone WH 3-7755.

The Museum of Science and Industry at 57th and S. Lake Shore Drive, is featuring exhibitions on "Chinese Culture in Focus," "Clocks," "Chicago Spacewatch," "Coal Energy," "Chicago," "Man in Flight" and the "Nobel Hall of Science."

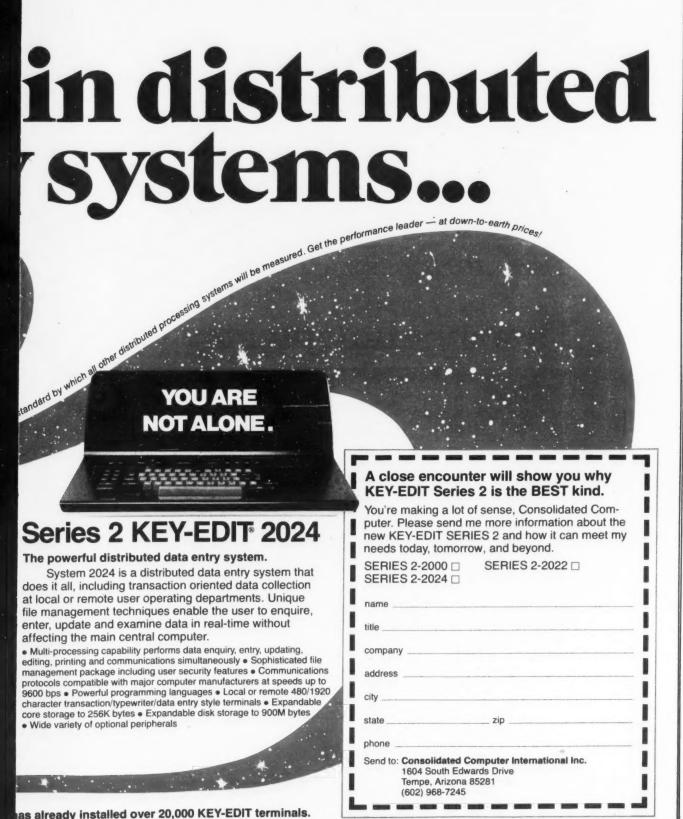
Museum hours on weekends are 9:30 a.m. until 4 p.m. On weekends and holidays, hours are until 5 p.m. Admission is free. Telephone MU-4 1414.

At the Polish Museum of America, at 984 N. Milwaukee, the culture and folk art of Polish people in America is on display.

The museum features biography, an art gallery, archives and a library.

Admission is free and the museum is open daily until 4 p.m. Telephone 384-

The Royal London Wax Museum at (Continued on Page Info/10)



### Restaurants

#### DINING DANCING ENTERTAIN-MENT

The Blackstone, Flaming Sally's, 636 S. Michigan, HA7-4300

Chicago Marriott, Turn of the Century, 540 N. Michigan Ave., 836-0100

Continental Plaza Hotel, Consort Room, Mich & Del., 943-7200

Grogshop, Prudential Plaza, 642-7676

Marriott's Lincolnshire Resort, Milwaukee Ave. & Halfday Road, Lincolnshire - The Main Brace, 634-0100

Martinique Restaurant, 2500 W 94th Pl, PR9-4000

Playboy Club, 919 N. Michigan, 751-8110

Pick-Congress, Uncle Albert's, 520 S. Michigan, 427-3800

Sheraton-Chicago, The Meet Market, 505 N. Michigan Ave., WH4-4100

Top of the Hilton, Arlington Park Hilton, Arlington Hts, 394-2000

### DINING

Allgauer's Fireside Rest, 2855 N. Milwaukee Ave., Northbrook, 541-6000

Ambassador East Hotel, 1300 N. State St., 787-7200 The Arbor, Sheraton-North

Shore Inn, 933 Skokie, Northbrook, 498-6500 The Bakery, 2218 N. Lincoln,

472-6942 Benihana of Toyko, 166 E. Su-

perior, 664-9643 Berghoff, 17 W. Adams, HA

7-3170 Binyon's, 327 S. Plymouth Ct., 341-1155

Blackhawk, 139 N. Wabash, 726-0100

Bollings Sample Room, Merch Mart, 2nd fl, MI2-4879

Bumbershoot, Ascot House, 1100 S. Michigan, 922-2900

Celebrity Room, Arlington Park Hilton, Arlington Heights, 394-2000

The Chalet, Bismarck Hotel, 171 W. Randolph, CE 6-0123

Chelsea Grill, The Whitehall,



105 E. Delaware, 944-6300

Chicago Marriott-Allie's Bakery, LaPlaza, JW's, 4th Level, 540 N. Michigan Ave. 836-0100

Churchill Restaurant and Lounge, 535 N. Michigan, 329-9020

Club ElBianco, 10067 Skokie Blvd., Skokie, 583-1363

Continental Dining Room, Elmhurst Inn Best Western, 279-0700 Continental Plaza-Chelsea Restaurant, Lion Bar, Mich. & Delaware, 943-7200

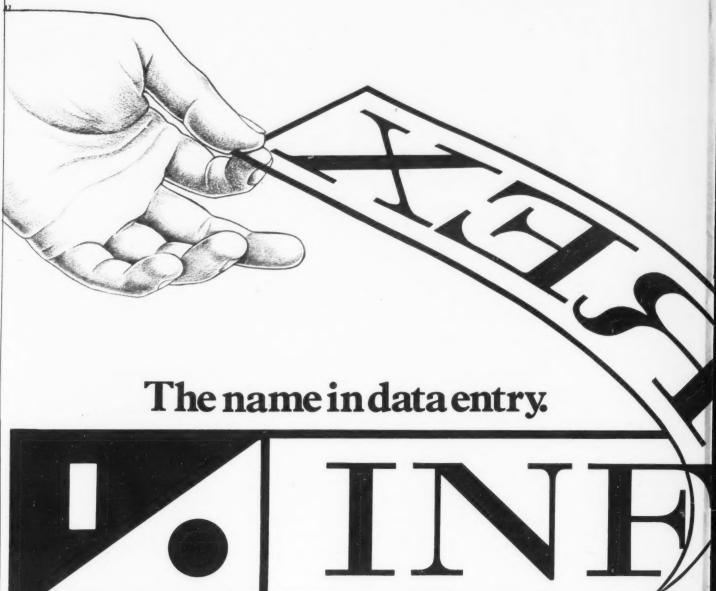
Dingbat's, 247 E. Ontario, 751-1337

The Drake, Avenue One, Lake Shore Drive & Michigan, SU7-2200

Eli's The Place for Steak, 215 E. Chicago, 642-1393 Haymarket Restaurant, The

Haymarket Restaurant, The Conrad Hilton, WA2-4400





### Restaurants

Henrici's Mart Restaurant, Merch Mart, 644-1710

Henrici's O'Hare Inn, Mannheim & Higgins, 299-6681

Hugo's Hyatt Regency O'Hare, Kennedy Expressway at River Road South, 696-1234

Hugo's Water Tower Hyatt House, 800 N. Mich, 943-5600

Hyatt Regency Chicago-Mrs. O'Leary's, Truffle's, 151 E. Wacker Drive 565-1000

Italian Village, 71 W. Monroe, DE2-7005

Jacques French Restaurant, 900 N. Michigan, WH 4-4795

Knight's Hearth Holiday Inn of Oak Brook, 17 W. 350 22nd St., Villa Park, 833-3600

Kona Kai, Marriott Motor Hotel, Kennedy Expressway at Cumberland, 693-4444

Kon-Tiki Ports, Radisson-Chicago, 505 N. Michigan, 527-4286

Langtry's 973 Waukegan Road, Glenview, 724-8904

L'Escargot, 2925 N. Halsted St., 525-5525

Le Boef — Galeon — White Forest Chateau, 787-0001

Long Johns Pub, First National Plaza, Dearborn &



Monroe, 263-1800 Marriott's Lincolnshire Resort, Milwaukee Ave. & Halfday Road, Lincolnshire — The King's Wharf. 634-0100

The Mavin, Allerton Hotel, Michigan & Huron, SU 7-4200

Maxwell's, The Westbury, 160 E. Huron, 787-2900 Miller's Pub, 23 E. Adams,

922-7446

Nikos, 7600 S. Harlem Ave., Bridgeview, 496-0300 O'Hare Hilton-O'Hare Room,

Balkan Grill, O'Hare Airport, 686-8000

Oval Room, Executive House, 71 E. Wacker Drive, FI6-7100

Pick-Congress-Royal Scotts Grill, Tipperary Inn, 520 S. Michigan, HA7-3800

The Pinnacle, Holiday Inn, 644 N. Lake Shore Drive, 943-9200

Theatre Club, McCormick Place, 791-6300

Ron Briskman's Hideout, Inc., 17 N. Wabash Ave., 372-2526

Royal Hearth, Ramada Inn, Congress & Canal, 427-6969

Scandinavian Room, Carson Inn, Nordic Hills, Itasca, 625-6116

Gibraltar Room, 642-7676 — Oakbrook Inn, 654-2800

Toffenetti's, 72 W. Randolph, DE2-8270

Trader Vic's Palmer House, State & Monroe, RA 6-7500

Wing Hoe Cantonese Food, 5356 N. Sheridan Road, 275-4550

Wrigley Building Restaurant, 410 N. Michigan, WH 4-7600



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### All of Chicago's a Stage Even If It's Not Broadway

theatre, Chicago's no Broadway. It's no small town either.

At the Arie Crown Theatre, right in McCormick Place, Eartha Kitt will be appearing in "Timbuktu." Telephone 791-6000 or 791-6190 for ticket information.

Beatlemania" an extravaganza put on by four Beatles imitators, is featured at the Blackstone Theatre at 60 E. Balboa. The telephone number there is 977-1700.

At Drury Lane South, located at 2500 W. 95th St., Evergreen Park, Forrest Tucker is starring in "Pat-

CHICAGO - When it comes to ches," a comedy. Telephone 779-4000.

> Eve Arden is appearing in "Most Marvelous News" at the Drury Lane East, also at McCormick Place. Telephone 791-6000.

"I Love My Wife," starring Brad Blaisdell, Leslie Denniston and Jerry Lanning, is being put on at the Drury Lane Water Town Place at 175 E. Chestnut. Call 266-0500.

At the Goodman Theatre, 200 S. Columbus Drive, "Native Son" by black playwright Richard Wright is being presented. Meshach Taylor plays Wright in an autobiographic

tale about a black man who moves to Chicago from a small southern town. Telephone 443-3822.

Ken Berry is appearing in "Guys and Dolls" at Marriott's Lincolnshire Theatre in the northwest suburbs. Telephone 634-0200.

"The Fifth of July" is being presented at the St. Nicholas Theatre at 2851 Halstead. It features Joan Allen, H.E. Baccus and Moira Harris. Call 281-1202.

Finally, "A Hat Full of Rain" is at the Theatre Building at 1225 W. Belmont. Telephone 327-5252.

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### Windy City Has Plenty to See

(Continued from Info/7)

1419 N. Wells contains more than 100 life-sized figures of famous people. The museum is open daily from noon until 9 p.m. except Friday and Saturday, when it remains open until midnight. Telephone 337-7786.

The Telephony Museum at 225 W. Randolph displays early and modern equipment including satellite communications. The museum is open weekdays from 10 a.m. until 4 p.m. Admission is free. Telephone 727-2994.

The Adler Planetarium at 1300 S. Lake Shore Drive is showing "Birth of the Universe" Monday through Thursday at 2 p.m. and Friday at 2 and 8 p.m. Admission for a Jults is \$1.50.

Exhibit hours are Monday through Thursday from 9:30 a.m. until 4:30

Chicago supports two zoos. Brookfield, at First Ave. and 31st St., has Australia House, baboon islands, bear grottoes, a primate house and a lion house. There are daily porpoise shows at the Seven Seas Panorama.

The zoo is open until 6 p.m. daily. Admission for adults is \$1.50. Telephone 242-2630.

Lincoln Park, located at 2200 North, in Lincoln Park, is a 35-acre tract housing a collection of 2,400 mammals. birds and reptiles. It's open from 9 a.m. until 5 p.m. Admission is free. For information call 294-4671.

### Info: a Wealth Of Exhibitions

(Continued from Info/1)

thusiasm for the show not only reflects good economic times in the industry, but also the fact that Info has come of age, Wolcott observed.

Session topics at the show include Prepackaged Software for Small Business Minicomputer Systems," "New Opportunities in Communications Security," "Steps to a Successful Small Business Computer System," "Organizing a Large Corporation for Office Automation" and "Techniques in Data Base Administraiton.'

# TON TOTAL PARTY IN DEPTH

### IN DEPTH

dentity and image - that is the most serious problem facing the software products industry today. In the past, software was often given away free, not only by hardware manufacturers but by users as well. Last year, however, software industry revenues were well over \$1 billion (with IBM accounting for one-third to one-half), and most forecasts for yearly revenues through 1985 project an annual increase of about 27%

Just what is the software products in-

Many people in the computer industry do not view software product companies as manufacturers. But they are, in every sense of the word. This view is based on the fact that software companies develop, market and distribute software products around the world.

This brings up the key point of defining exactly what software is and how a software product differs from a computer program. The controversy surrounding these definitions has dramatically impacted on Wall Street's perception of the growth and development of the software products industry. Let's take a closer look at them.

### What Is Software?

Ever since the inception of the software products industry in the 1960s, there has been a great deal of discussion, debate and even confusion concerning the definition of software. This difficulty in defining software, I believe, stems from the very early days of computing, going back more than 25 years - to the early 1950s.

At that time, when private industry began to use computers for business and scientific purposes, no one really understood the importance of computer programming (or software). There was little thought that the program would eventually constitute an investment greater than the hardware itself; hardware was the prime expense, and the value of software was not appreciated.

Software generally emulated current procedures or systems. There was little system design in those early business installations. Software was put in the public domain not only by the hardware manufacturers, but by the users, who freely made their software available through user group libraries.

Very few people believed that soft-

### The Software **Products Industry:** Its Future **And Promise**

By Martin A. Goetz

ware would have a long life - or that the cost of software maintenance could ultimately be many times the cost of the original software development.

### High Points of '60s

During the 1960s, as second- and third-generation computers become more complex, the generalized software given away by the manufacturers became more and more difficult to use. It was during this period that the user began to realize the importance and critical nature of software.

It was also during this period tha 1. Some companies began to sell soft-

ware products.

2. The Justice Department began to investigate whether giveaway software was an illegal tie-in sale.

3. There were technical conferences on software which addressed its engineering, design and reliability.

Since 1969, and with the advent of unbundling, the question of "what is software?" has been getting more persistent. The question is today being asked by:

· Financial people when analyzing a corporation's assets and liabilities

 State and federal tax authorities when viewing new revenue sources, especially sales tax and personal property taxes

• The Internal Revenue Service when considering the investment tax credit question.

• The Copyright Office when deciding whether software comes under its jurisdiction.

• The Patent Office when deciding whether the inventive concepts in a program constitute patentable subject

Lawyers when drawing up con-

· Judges when deciding cases involving ownership of software.

• The State Department when licensing and exporting high technology to the Eastern Bloc countries.

• The Justice Department in the current U.S. vs. IBM antitrust case.

Today, because of the large amount of money at stake, the definition of software often seems to vary based on the various economic interests of the parties involved.

Through the years, I've developed a point of view on the nature of software that is a technical one — a viewpoint that I believe can be fully defended. Simply stated, a computer is a machine comprised of many components, and software is one of the machine components of a computer system. This view is based on the following facts: Software operates as an integral part of a computer system; software programs are interchangeable with hardware circuitry; and software is interchangeable with firmware.

Thus, software is a component of a computer system just as a computer circuit, terminal or disk is a component. Figure 1 gives an example of the hardware and software components that make up a computer system.

### Packages vs. Programs

To differentiate between a software package and a computer program, let me list some of the significant, distinctive features of each. First, software packages:

1. Software packages are priced, guaranteed and maintained via a formal, legal agreement between the buyer and the seller.

2. Documentation for a software package must be produced at all levels for the buyer, for the manager, for the technician and for inexperienced as well as experienced personnel.

3. Software packages inevitably face competition and, therefore, must be evaluated continuously in terms of efficiency, price, ease of use, usefulness and so forth vis-a-vis its competition.

4. Software packages can be utilized by a large number of users for a price which reflects only a small part of the total development cost.

5. Software packages are field-tested by many users before they are actually bought by the typical user.

6. Software packages are maintained (Continued on In Depth/9)

# IF YOU'RE INTO THE COMPUTER BUSINESS, WE HAVE NEWS FOR YOU:

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Starting November 6th, America's fastest-growing industry will have its own weekly newspaper, Computer Business News. As publishers of Computerworld, one of the most successful business publications in the U.S.—as well as several other leading computer publications around the world—we know the computer business. And we know there is a strong and growing need for a weekly newspaper like Computer Business News.

Computer Business News will be edited to serve key executives in management, engineering, production and marketing at original equipment manufacturers, systems houses, distributors, representatives, internal systems groups at large end users and other multiple unit buyers of computer products and services. According to International Data Corporation, the world's leading EDP market research firm, this marketplace is over \$4 billion now, and should grow rapidly to \$9 billion in 1981! So the need for good, up-to-date information is especially important.

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(omputer Business News

Hewlett-Packard ends the computer computer compromise.

### **The HP 250**

### **The HP 300**

The lowest-priced computer with true data base management, the HP 250 was designed to be simple both to program and operate. The keyboard is like an electric typewriter, the numeric pad like an adding machine, and the CRT adjusts vertically and horizontally for

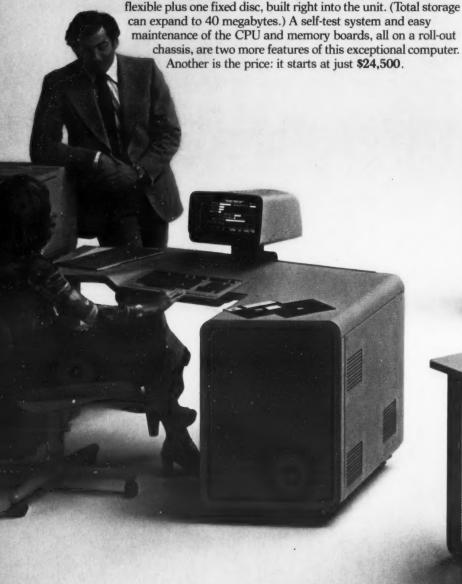
Eight soft keys underneath the screen can be programmed to lead the user through each task step-by-step. They'll also help you cut corners in writing applications software, especially when working with the other tools we provide-IMAGE/250 DBM and its inquiry scheme QUERY/250,

FORMS/250, and REPORT WRITER/250. The system can accommodate four terminals and has up to 256K bytes of main memory. You can also get up to three flexible discs, or one

Virtual memory, silicon-on-s an Integrated Display System gives a very compact frame.

It can handle up to 16 users megabyte of main memory and ove do transaction processing and sort-a control every application from the c mable soft keys can be captioned on of choices in running a job. And the 'windows' for viewing several differ

can even be scrolled individually, bo width of 160 lines in lengt Two available-F our IMAGE English-like easier to v your infor





### The HP 3000 Series 33

on-sapphire (SOS) technology and gives the HP 300 big performance in

sers simultaneously, grow to a lover 250 megabytes of disc storage, sort-and-print jobs simultaneously, and the central console. Its eight programd on the display to give the user a series the display itself divides into multiple different parts of an application. They by, both vertically and horizontally, to a 160 columns and several thousand length.

Two widely used languages are e—RPG II and Business BASIC. And AGE data base management, plus an h-like inquiry facility, makes it much to write your programs and manage information. The price? From \$36,500.

The latest addition to the HP 3000 family, the Series 33 also uses SOS to pack a lot of power into a simple desk unit. Designed for multiple users at remote terminals, the system can expand to a megabyte of error-correcting main memory, and grow to 960 megabytes of disc storage. It offers both the operating system (MPE III) and IMAGE data base management that set the HP 3000 line apart from other interactive computers.

The basic system consists of the CPU (now on three chips totaling less than one square inch instead of 700 square inches of PC boards), 20 megabytes of cartridge disc storage, a double-sided flexible disc with one megabyte capacity, and a microprocessor-based console that doubles as a service 'window' on the system, with a plug-in self-test cartridge that runs a complete check in less than two minutes. (It can even be done remotely via a modem.)

You can choose a variety of terminals, including our new 400 LPM line printer, to configure the system precisely the way you want it.





For a hands-on demonstration of these computers, call the HP office listed in the White Pages. Or write He

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You can choose a variety of terminals, including our new 400 LPM line to configure the system precisely the way you want it.





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### The HP 3000 Series III

OS to pack a e terminals, grow to 960 nd IMAGE e computers. ess than one cartridge microprocesplug-in selfven be done The top of the line HP 3000 Series III offers more power than the Series 33, while sharing the same powerful operating system and data base management. It has six high-level languages (COBOL, RPG, APL, FORTRAN, BASIC and SPL), as well as networking and manufacturing software\* for inventory control and materials planning. And 16K RAM semi-conductor memory is available for the unprecedented price of \$32K per megabyte.

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(Continued from In Depth/1) by the vendor.

7. Software packages are enhanced to incorporate the latest state-of-the-art features.

On the other hand:

1. Computer programs are not guaranteed.

Computer programs are usually designed for a particular user and application.

3. Computer programs are significantly more expensive to build than an equivalent package — usually by a factor of 20 or more.

### Wall Street's Perception

Looking back over the last 10 years, we can learn a great deal about the evolution of software companies and Wall Street's perception of them.

Between 1968 and 1970, there were well over 100 new public issues for companies developing and marketing software products. When IBM announced the unbundling of most of its software in 1969, many believed a new and highly profitable industry was about to explode — and Wall Street was enamored with the high profit potential for these companies.

In fact, Wall Street interests drove the market price of software stocks unbelievably high. But the high multiples of 40 to 80 or more times earnings were soon reversed and, by 1974, the multiples of those companies which still existed became unrealistically low.

Was Wall Street's timing wrong, or were there basic misconceptions concerning software product companies? It was a little of both.

Certainly the timing was wrong. And the recession of the early 1970s didn't help the embryonic software industry. But the most crucial reason for the failure centered around the unrealistic expectations of many of the software companies and of the Wall Street analysts who religiously followed these companies.

Two significant fallacies of that era

1. There is a short time lag between developing and marketing successful software products.

Software is a long-term investment. It takes at least five years from the conception of a software product to its successful acceptance in the market-place — one to two years for developing and testing and another three or more years before sales return a profit on the investment.

2. Software does not require a major effort by marketing and sales forces.

Prior to 1970, softwar: was bundled, put in the public domain and viewed as free. How naive it was to believe that when software became priced, users would rush to a software company's door to purchase the software. There was also heavy competition in the marketplace, and the key to success became an effective marketing organization coupled with a cost-effective product.

These two expectations were proved by experience to be false, but software product companies do have two inherent financial advantages which have been of continuing interest to Wall Street analysts.

The first advantage, which is not unique to software product companies alone, is the low capital required to produce a copy. There is a strong analogy between software products, computer hardware, calculators and other mass-produced products. While the initial design and prototype can be very expensive, the cost of a copy is extremely inexpensive.

For example, the actual cost of manufacturing computer hardware typically represents about 10% to 20% of the sales price; for a calculator, about 5%

(before the price wars); and for software products, between .1% and 5% (depending on the sale price). Thus, the very low production cost of software products is a definite advantage.

But the most profitable, and therefore most advantageous, aspect of a software products company's operation is its unique ability to double and triple its rate of orders (and deliveries) without having to increase its manufacturing plant, equipment, production personnel, assembly lines or testing equipment. No other industry shares this profit phenomenon and advantage.

While these two advantages are im-

portant to the growth of software product companies, they are, however, important only from the profit potential and from the limited capital outlay required for production facilities. Obviously, capital is still required for personnel expansion — and software products do require highly paid software development engineers.

To build and maintain a strong sales force also requires capital. And, since software is increasingly being leased on a monthly basis, many software companies find they also need operating capital.

Nevertheless, it is obvious today that (Continued on In Depth/13)

### FIGURE 1. MAJOR COMPONENTS OF A COMPUTER SYSTEM

HARDWARE COMPONENTS CENTRAL PROCESSING UNIT CENTRAL MEMORY HARDWARE DISK AND TAPE DRIVES REMOTE ENTRY DEVICES TERMINALS PRINTERS SYSTEM SOFTWARE COMPONENTS **OPERATING SYSTEMS** TP MONITORS DATA BASE MANAGEMENT SYSTEMS LANGUAGE TRANSLATORS PROGRAMMING AIDS REPORT WRITERS SOFTWARE APPLICATION SOFTWARE COMPONENTS **ACCOUNTING PROGRAMS ENGINEERING PROGRAMS** MARKETING PROGRAMS MANUFACTURING PROGRAMS

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The IMT-150 terminal is the first on-line information retrieval terminal from Kodak to incorporate distributed logic into its mode of operation. Blocks of search information from your mini or mainframe computer are "down loaded" to the microcomputer-based IMT-150 terminal in lightning-fast bursts. Then, relying on its own intelligence, the IMT-150 terminal performs real time, on-line information look-ups.

The ability of the IMT-150 terminal to think on its own reduces its dependence on your computer, freeing it for weightier computer tasks. So your EDP operation runs leaner,

smoother, more efficiently overall.

There's a lot more to tell about the Kodak IMT-150 terminal. For example, it reduces look-up errors, because it stops at precisely the document you want. There's no backtracking or machine overshoot. It eliminates expensive magazines that require leaders and trailers. It can store more than 10,000 letter-size documents in a 4" x 4" x 1" magazine. And it delivers dry, sharp hard-copy prints on demand.

Want to find out more about how to take the strain off your computer?

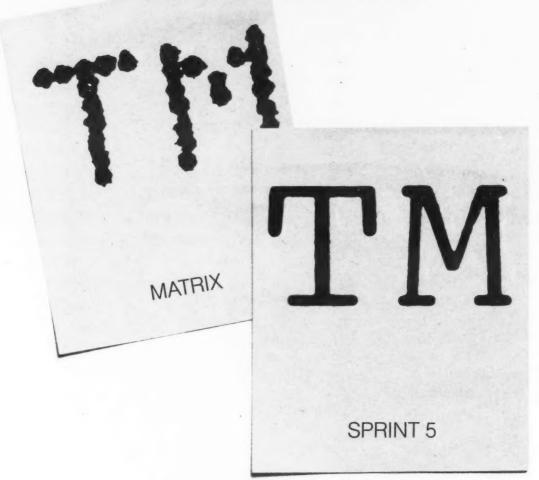
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For more information, contact your nearest data terminal dealer or Qume, 2323 Industrial Parkway West, Hayward, California 94545.

(Continued from In Depth/9) the profit and growth potential which Wall Street predicted 10 years ago can be a reality for those software product companies willing to make the commitment to adequate product development and a strong marketing and sales effort and support.

### The Industry Today

There are many organizations which are developing software packages — some merely as a by-product of their internal DP activities and others "seriously." Examples of some software by-products come from banks which sell in-house banking packages to other banks, industrial firms which offer internally developed, manufacturing-oriented packages and service bureaus which market programs originally offered as a local service.

Those organizations I have labeled "serious" software package developers include the independent software companies and the computer hardware firms which focus on software.

The computer hardware manufacturers have demonstrated their "expertise" in the software area over the last 15 years. In fact, until the last several years, they have virtually monopolized the marketplace with their "free" software. But history and experience have shown that these manufacturers have a habit of producing slow, inefficient, bug-prone and long overdue software.

The independent software companies, on the other hand, have established an enviable record over the last several years. Their products are innovative, well-supported and well-documented.

Since the independents are in the software business for profit, they are well aware that their products must be superior to those of their competition. This competitiveness, which is only possible in an unbundled software environment, results in numerous benefits for the computer user, as well as for the independent software product companies.

Those who are unconvinced of the superior quality of the independent software companies' products compared with computer manufacturers' software should survey any number of current users of software products purchased from independent software companies. Their personal experiences will undoubtedly make a strong case in favor of such software.

This is especially true since a good percentage of the products still on the market today have survived the economic trial by fire of the early 70s, when many of the fly-by-night software houses were folding in rapid succession. Additionally, the last several Datapro/Datamation software product surveys show there is a significant difference between the users' evaluations of the products developed by the independents vs. the hardware manufacturers. For the last five years, the independents have been rated significantly higher than hardware manufac-

turers in every category surveyed.

It is also a matter of record that soft-

ware companies are attracting the most talented personnel and are completely dedicated to satisfying their users' needs, to staying ahead of their competition and to growing and prospering despite all obstacles. It's simply the free enterprise system at work — nothing more, nothing less.

### A Growing Industry

It may seem presumptuous to discuss software products as an industry. After all, according to Dun and Bradstreet, there are only about 30 major industries in existence. Even computer

manufacturing is listed as part of the office machines industry.

Nevertheless, it is apparent that the impact of software products will eventually surpass that of computer hardware. Software product sales are expected to total as much as \$4 billion by 1985. In fact, software products will act as the catalyst in achieving the full potential envisioned for computer hardware usage many years ago.

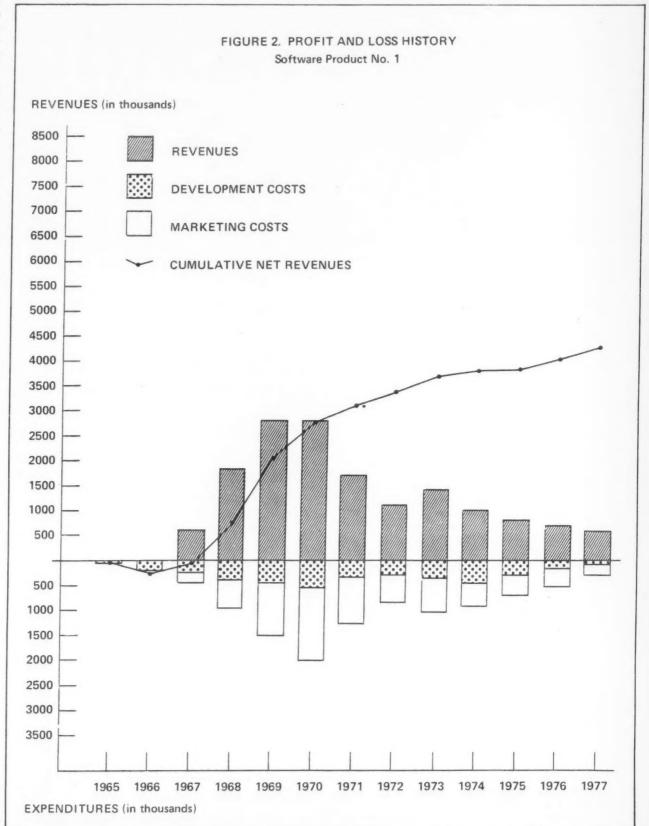
Today, the marketing of software products is one of the fastest growing segments of the U.S. economy — and the surface has only been scratched.

The estimated annual growth rate is approximately 27%, despite the fact that almost all computer companies still practice some form of bundling.

My own forecast for the potential growth rate is even more optimistic, as long as the following favorable events occur:

• IBM does not deliberately develop its new Series E and H hardware and operating systems to preclude existing and proposed software packages from operating in those environments.

• Applications software package (Continued on In Depth/14)



(Continued from In Depth/13) technology will steadily improve so that future applications packages will be readily adaptable to individual customer requirements.

More hardware manufacturers will completely unbundle.

### The Technology Gap

There exists today a credibility gap in the potential effectiveness of computer usage. Why this gap was created is not important, although I've always been quick to blame it on the computer manufacturers.

In any event, it's there and it's real . . . so real, in fact, that many companies are still in the Dark Ages when it comes to the effective use of computers

Today's DP problems are not simply the prolonged time and resulting high costs involved in program development. There are other grave problems that can play havoc with a user's computer utilization. Some of the problem areas include:

 The quality of existing computer applications, which is shamefully shoddy.

The unreliability and unpredictability of computer applications in production.

 Maintenance and enhancements performed in an undisciplined environment where there is inaccurate or inadequate supporting documentation.

• Little management control during most stages of an application's life cycle

 Typically, a great deal of duplicated effort in applications development.

The last point is perhaps one of the major keys to the effective use of computers. Although there are hundreds of thousand of programmers available today, there are only hundreds or thousands of creative, talented senior personnel capable of building quality applications.

Quality software cannot be economically and practically developed when companies are continuously trying to reinvent the wheel. Through the use of software packages, available human talent can be amplified.

A data base management system, a telecommunications monitor or a well-designed complex application are often beyond the resources of an average user installation. The purchase of quality applications packages can permit such an installation to automate more quickly and to dedicate its personnel to unique needs rather than to functions fulfilled by available software packages.

Even if a user does develop his own custom applications, systems software packages (e.g., programming and testing aids), can dramatically increase the productivity and reliability of such custom applications.

Most importantly, a user can now purchase a needed system which has already been proven in operation at many installations. As a result, the user can get on the air quicker, at lower cost and hopefully with fewer operational problems.

In many cases, these advantages are only possible through applications and systems software packages. These packages therefore are beginning to help to close the software technology gap that currently exists.

### New Type of Application Packages

Because of today's recognition of applications packages' value, these packages should experience rapid advancement in the years to come which, in turn, will result in significant changes in the associated technology. In particular, I am convinced that a new type of applications software package will emerge

The wave of the future will be "skeleton" applications that can be enhanced or customized by the user to meet his specific requirements. Although this concept is not by any means revolutionary, the way in which it will be accomplished may be.

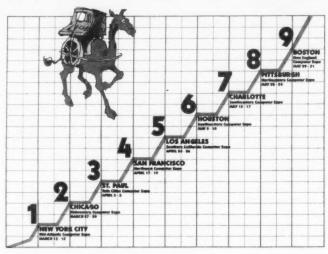
Today, most applications packages are delivered with the source code for modification by the user to meet specific requirements. This approach creates two problems:

1. The user must initially be educated in the structure of the package.

Subsequently, he becomes responsible for its maintenance.

The approach of the future will be to design a package with inherent flexibility to accommodate "user-added" logic at strategic points. This is not as simplistic a trend as it may first seem. Current software technology does not

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provide adequate facilities for precompilation and other prerequisites for developing a modular system technique.

However, when these systems do appear, the use of applications packages will expand to match the growth currently being experienced in the area of systems software packages.

#### **Systems Software**

The future of systems software is a subject that I and my company think about constantly — both the short-term and the long-term. Since I've introduced the term "systems software," it is important for me to define my concept of it.

The systems software to which I'm referring is for IBM 360 and 370 mainframes (with which I'm most familiar) and includes all generalized software that is not directed toward a specific user application or industry.

Systems software, therefore, includes:

- All components of operating systems including job, file and storage management; security; time-sharing; utilities; and spoolers.
- Language translators i.e., compilers and assemblers.
- Data base management systems.
- Sorts.
- Communication monitors.
- Performance measurement tools.
- Report generators.
- Programming aids librarians, utilities, test data generators, automated documentation systems.
- File management and generalized retrieval systems.
- Computer accounting and tape management systems.

Systems software thus encompasses a very large class of programs. To address the question of the future of systems software as a whole, each of the component elements must be considered. And, before we can reach any conclusions, we must first try to answer the following questions (some of which we have already touched on):

- 1. What is the current trend of systems software?
- 2. What is the relationship of hardware to software?
- 3. What will IBM's new generation of computers look like?
- 4. Will there even be a new generation?
- 5. Was the 370 a new generation?
- 6. Does the extended control storage of IBM's latest computers indicate that "software in firmware" is a growing trend?
- 7. Will all systems software eventually be separately priced?

After taking these questions into account, I believe that the future of systems software, as I defined it, is very bright and will continue to grow rapidly for many, many years. Let me explain why I feel so optimistic.

In the last 10 years, the number of different types of systems software has increased at least 20 times. Certainly, if we include the total number of systems software packages, the number has increased 50 times.

For example, there are about 10 data

base management systems, five to six communications monitors, about five operating systems and approximately 20 file management systems. If we measure the growth in lines of code 370/168 and 3330 MVS.

IBM may attempt extensively in firm do not believe IBM

think this trend will continue at the same rapid rate over the next 10 years.

The next question must be, will all systems software turn into hardware or firmware?

(by looking at operating systems), sys-

tems software is proliferating wildly. I

Today IBM is selectively putting software into firmware. For example, the 370/138 and 148 have highly repetitive portions of VM and VS1, and the

370/168 and 3330s have portions of MVS.

IBM may attempt to market software extensively in firmware in the future. I do not believe IBM will be successful—if indeed it tries on a grand scale. And, I believe that, in the future, most software will not be put into firmware.

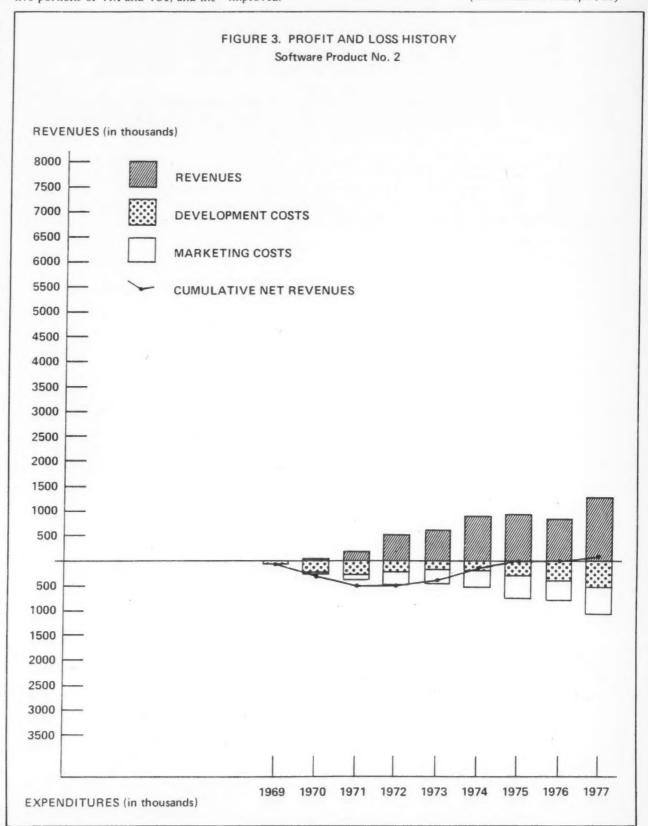
Will there be a new generation of computers? Everyone is speculating on this question. My feelings are that there will be a slow evolution and that most of today's code and systems software will be usable for the next 10 years, particularly if it is upgraded and improved.

Further, I believe this code will be fully usable on any next generation of computers — if there is one.

Will operating systems software be separately priced in the future? I think so. I believe it's only a matter of time and, depending on the pressures put on IBM, it can happen anytime from six months to five years from now.

I predict that in three to five years, all of IBM's operating systems will be separately priced. And this will open up a large market for independent software companies.

I'm bullish on systems software — all (Continued on In Depth/16)



(Continued from In Depth/15) of it. And I don't believe that IBM will get all of the pie.

#### The Marketing Business

The business of developing and marketing software products is just as complex as the business of selling computer hardware and, therefore requires considerable financial and human resources. There are several marketing considerations that clearly reflect the true nature of software prod-

nets

Foremost among these considerations are the need for an effective marketing and pricing strategy for a product, continued investment in a product even after its release and substantial technical support.

As mentioned earlier, a common misconception is the assumption that a software product can sell itself. A software company must be prepared to develop and support a thorough and effective marketing campaign to sell each of its packages to the public.

This campaign should involve advertising, sales brochures, extensive sales training, market analysis, performance specifications and user literature, among many factors. These marketing tools and their accompanying costs are a prerequisite for creating a viable software product. In fact, one reliable measure of the potential success of any software product is the resources that are allocated to its marketing.

It would be a serious mistake to ex-

Kenneth W. Cakebread, Manager of Data Processing, Trans-Air Forwarding and Brokerage, Inc., Inglewood, Calif.

"I had 30 days to convert about 220 programs from our old batch-oriented

Honeywell 62 system to our new Wang VS system. Not only did I do it: Thanks

to the programming power of the VS,

I actually came up with more.
"Before we converted to the VS, the

biggest problem we

pect that, once a product is operational and out in the marketplace, investment requirements end. The experiences of several successful software companies verify that extensive programming costs are likely to be incurred throughout the life of a product. Some of the reasons for these additional costs are:

 Enhancements/upgrading will probably be necessary to keep the product competitive.

 Changes will probably be required as a result of inherent design shortcomings

 User requirements and environments (i.e., operating systems) frequently change.

Based on experience, as a general rule of thumb, a software "manufacturer" should expect to invest at least an additional 200% of initial development costs during a product's life. For example, if it is estimated that a package can be brought to market for \$100,000, the anticipated total cost for that package should be approximately \$300,000.

The graphs in figures 2, 3, 4 and 5 represent case histories of actual software products developed by Applied Data Research, Inc., founded in 1959 and one of the oldest software houses. These graphs illustrate the continuing financial commitment necessary to maintain any successful software package. The graphs show the potential profits, the various time lags between development and profits and the longevity of some successful products.

The success of a product can also depend on the technical support provided after the sale. Customers want and demand service, and they are willing to pay for it. The guarantee of product maintenance, personnel training and installation support must be much more than an impressive sales

Fulfilling this guarantee will ensure that the package will be used properly, that satisfied customers will continue to use the product and be available as references and that satisfied customers may become potential users of other packages from the same organization.

### Cost-Effective Pricing

Once a company commits itself to a marketing and support program, pricing becomes the final element critical to the financial success of the product. Several sound pricing strategies have been developed and are dependent upon:

• The financial strength of the developer.

• The amount of competition and degree of competitive pricing.

• The value of the product to the user.

• The expected life of the product.

The type of product.

The following list includes some specific pricing strategies that have been used in successfully selling proprietary software. The terms "lease" and "license" are used interchangeably, both implying restricted use by the buyer without ownership.

1. Free trial. No commitment is required on the part of the user.

# EDP professionals have a word for the new Wang VS computer.

"Incredible."
Vice and ing I haus was

Richard Berger,
Vice President
and Data Processing Manager, Bughaus, Inc., a Volkswagen service
center network
headquartered
in Hartford,
Cons

Conn.

"Because we had been using a computer – the Burroughs B1700 – with card input sequential files and no video displays, we suffered long delays and storage constraints.

constraints.
"Now, with
our Wang VS
system, storage
is virtually unlimited, and
we simply

recall a screen load of information on the CRT to make a change in seconds — all of this without interrupting our normal flow of work.

"We've put everything in our business onto our VS system, including payroll, accounting, sales and wholesale and retail inventory control. And we did it in 90 days without changing languages and with only minor modifications in almost 90 COBOL programs."

EDP professionals in more than 100 companies are singing the praises of the Wang VS. And for good reason.

good reason.

The VS is a remarkably sophisticated, fully expandable virtual storage computer designed to provide maximum interaction in a mainframe environment.

The VS provides for distributed data processing, thus avoiding costly consumption of mainframe resources. It's fast, responsive, ease to use and can support up to 2.3 billion bytes of on-line storage. What's more the VS speaks EDP people's language: COBOL, BASIC, RPG II and ASSEMBLER.

We also think you'll appreciate how simple the VS is to operate. In fact, because of its level of sophistication, it can be operated by people with little or no computer-related training or experience.

computer-related training or experience.

One more thing: the entry level price of the VS is under \$50,000. Which is perhaps the most remarkable thing of all about this computer.

For more information on the VS, return this coupon to Wang Laboratories,

"We are absolutely amazed at the throughput rate we've achieved with our Wang VS. On our very first job for one of the country's largest student insurance agencies, the VS arrived in Pittsburgh on December 23 and was completely installed and operational on-site on February 15, with 61 programs written, debugged and tested—all by only two people—and not a single line of code had been written until the machine came in the door.

"The VS really fulfills all of our requirements, particularly in areas where other systems are weak: cost/performance, language-availability, userutility software.

"I think the real key for the DP manager is the utilities available with the

had in the accounts "Amazing." receivable area was misapplying cash. No more. Now, by capturing current in-formation and keying it ger is the utilities available with the VS, its speed and its interactive COBOL into the computer from a workstation, we're able to compiler. These three things combined make for a sort out potential problems long before they get to the accounts very powerful tool.

J.P. Scott, receivable stage. And with Wang's on-line "Unbelievable." **Data Processing** Manager, Aptech Computer editing capabilities, I'd say we've cut our Systems, Inc., Pittsburgh, Pa. average editing time on a per-item basis from 30 seconds to a single second. "And believe it or not, while the VS gives us faster access and maybe triple the programming efficiency of our old system, it was only half

I'd like to know more send me a copy of your	about the Wang VS. Please Executive Brochure.
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Title	Phone
Company	
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CitySt	Zip DP88/CW10168
Comp word p	outer and processing stems.
Wang Laboratories Inc. One Industrial Ave.	Tel. (617) 851-4111 Telex 94-7421

### THE TWEEDSTAY

2. Monthly payment. This agreement to pay on a monthly basis can be canceled at any time (or on 30 days' notice).

3. Three-month minimum followed by monthly payments. This strategy is similar to Strategy No. 2, except that a three-month minimum lease is required. This was IBM's original standard policy for program products; however, it was eventually abandoned in favor of Strategy No. 2.

4. Long-term lease. From one to five years is the general standard for long-term leasing of many of the software products produced by independent software companies.

5. Permanent license. Under this agreement, the buyer can use a package indefinitely. Unfortunately, it is frequently too easy for a vendor to "hit and run" — that is, arrange for permanent use, but then fail to support the program. A user, therefore, must ensure that he will receive the source code if the vendor should refuse to maintain his package. Most companies offer separate maintenance contracts along with a permanent license.

6. Monthly rental convertible to permanent license. In effect, this is a combination of Strategies No. 2 and 5.

7. Metered use. This strategy is similar to a concept originally used by Xerox in the copier field. An internal meter is one of the factors that determines the cost of a package to an individual user. Although a relatively new concept, metered usage has been implemented on an experimental basis by several companies.

Obviously, there is a wide variety of pricing strategies. In today's economy, costs and pricing plans are particularly critical to a software package buyer. As a result, the alert software manufacturer should reappraise his pricing policies continually in light of changing economic and market trends.

### Reasons for Growth

Both systems software and applications packages will see unequalled growth during the next 10 years. This growth will be oriented toward supplying software packages to users of unbundled hardware, i.e., IBM hardware

Although DP managers are finally beginning to buy more software packages, less than 5% of the potential market has been tapped. This situation is rapidly improving for several reasons:

• The relatively healthy economy has enabled DP managers to again investigate programming developments in terms of cost and time savings. Applications and systems packages that can improve programmer productivity or reduce the time to get an application operational are now very much in demand.

In addition, there is a shortage of programmers, which makes commercial packages more attractive than time-consuming in-house development.

• IBM has paved the way toward making unbundled program products an acceptable method of doing busi-

ness

• The DP manager today is facing his greatest personal crisis. He is finally taking his appropriate place within the management ranks and, like every other manager, is finding that he must

either shape up or ship out.

The "programming mystique" of the '50s and '60s has disappeared and, with it, the privileges of programming personnel. There is no longer tolerance for the "indispensable," undisciplined programmer or the short-sighted, disorganized DP manager.

Data processing has become just another department in most large organizations. As such, it must function in a disciplined, business-like manner.

### Make vs. Buy Dilemma Over

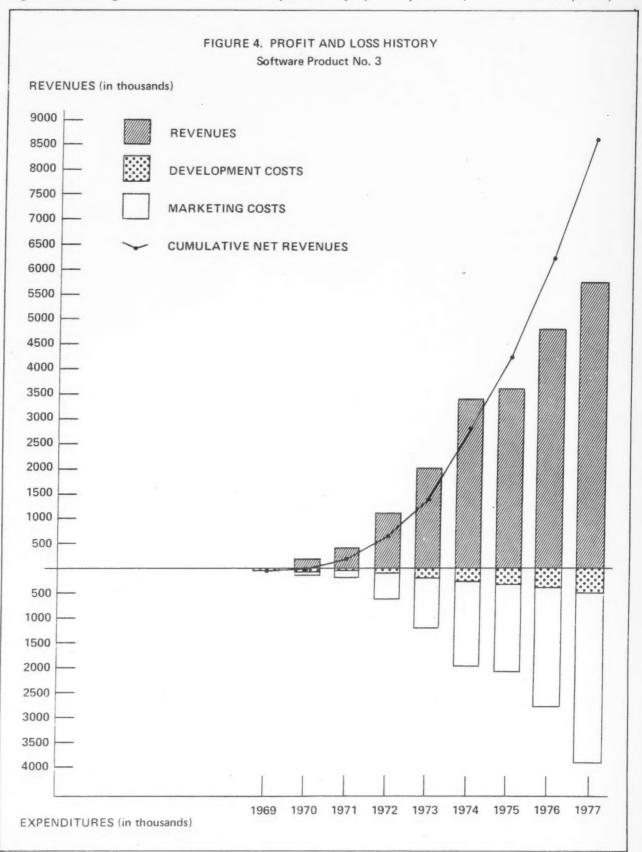
Historically, most successful software products cost \$100,000 to \$1 million or more to develop and maintain. These figures dictate the growth of the software products industry since the economics of the "make or buy" decision, therefore, are obvious.

For example, if a company can buy a

product for less money than it would cost its DP center to develop in-house, there is only one decision to be made: buy outside. Seldom can a user internally develop a software product for less than its purchase price. The ratio of a package purchase price to the inhouse development price is usually 1:10 and often is 1:100 or more.

Further, it is often highly unlikely that the user has available the necessary in-house technological expertise. Even if he can develop the product; the

(Continued on In Depth/19)



# Now is the time for BASF to declare its independents.

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TW DEPTH

(Continued from In Depth/17) time and cost to document and maintain it are often prohibitive. Thus, the purchase price of a software product is invariably much less than the ultimate

cost of internal software development. And, even more important, buying commercial software assures the user of the latest technological advances and allows personnel to perform the more critical DP activities unique to the installation.

### Tomorrow's Industry

Despite the favorable change in corporate attitude toward software and the blossoming marketplace, rough roads are still ahead for software companies. Investment money is still hard to come by, especially for investments such as those in software development where a return may take three years or more to materialize.

The potential and leverage are still there, however, as demonstrated by the significant number of software companies which are now beginning to reap large profits on their software product investments.

If computers are to be used more effectively and less expensively, users themselves must promote the growth of the independent software industry. Years ago, there were visions of simplified computer usage, extensive management information systems, inexpensive automation of much clerical paperwork, and low-cost program de-

Martin A. Goetz is senior vicepresident and director of the Software Products Division of Applied Data Research, Inc. (ADR). He holds the first U.S. software patent and is a co-author of High-Level Cobol Programming, published in 1977.

Goetz began his career as a programmer with Sperry Rand in 1954; in 1959, he co-founded ADR. In 1973 he served as president of the Association of Data Processing Service Organizations' Software Industry Association. Goetz holds bachelor and master degrees from the City College of New

York.

velopment. These goals can still be realized, but only through the development of improved applications and systems software packages.

As the entire software industry grows, it is inevitable that certain products will become recognized as leaders; trade names, or brand names, will become synonymous with quality software. To date, IBM products have not succeeded in becoming the brand name for quality. In fact, several independent companies' products are close to becoming a DP household word, since these companies have primarily specialized in relatively restricted areas

of expertise.

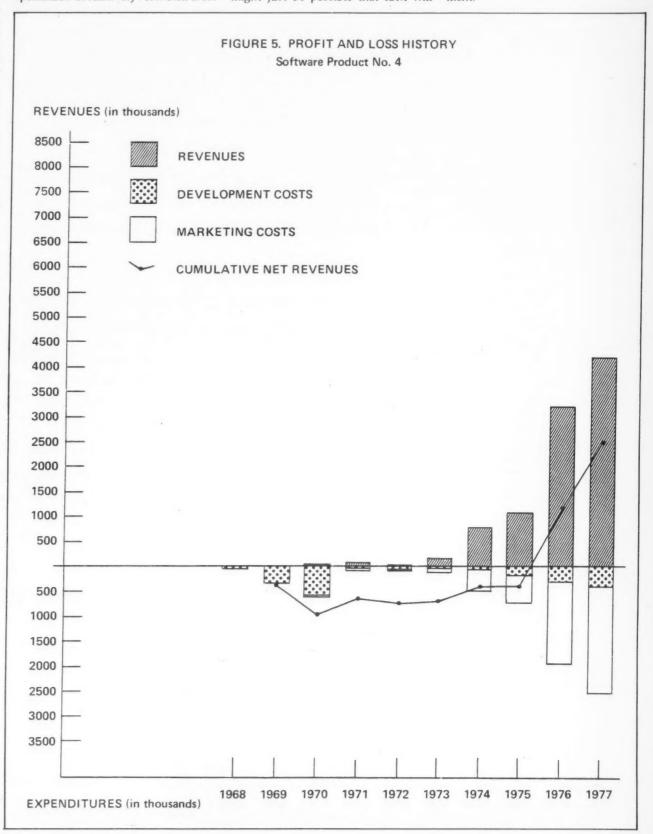
Furthermore, independents in general have shown themselves more responsive to user problems, to enhancing their product based on user requests, to producing efficient and easily used packages and to developing a variety of attractive pricing schedules.

Finally, the financial stability of the independents is improving daily to contribute further to their good reputation. In the long run, the DP community may well look first to the independent software companies to satisfy their software needs. In the extreme, it might just be possible that IBM will

become Brand X in the software products market.

The future of the software industry appears to be very promising, with very significant growth only around the corner. For those firms willing and able to make the necessary financial and human resource commitments, the proverbial pot of gold is still waiting at the end of the software package rain-

Most importantly, the real benefactor will, at long last, be the user who, for the first time, will have the necessary tools to truly control his DP environment.



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### Announces Price Hike

### CA Reconfigures Low-End Syfa System

CW Staff

IRVINE, Calif. -Computer Automation, Inc.'s Commercial Systems Division (CSD) has reconfigured the entry-level member of its Syfa network processing systems line and at the same time boosted the average price of most other Syfa hardware by

Designated the DSK-32, the repackaged CSD system replaces the DSK-10 at the bottom of the Syfa product line and differs

from its predecessor only in disk capacity and price, according to a Whereas official. DSK-10 incorporated 10M-byte disk units and cost \$45,000, the DSK-32 supports up to eight 32M-byte disk systems and costs \$2,500 less.

Under the CSD's recently announced general price restructuring, however, one of the larger Syfa configurations and most of the Syfa systems' hardware modules jumped in price by \$500 to \$3,000. The cost of a DSK-80

system with one 80M-byte disk unit, for example, has risen \$2,500, from \$56,000 to \$58,500, while an additional 80M-byte unit has increased in price from \$17.500 to \$18.000.

At \$71,000, the cost of a top-ofthe-line DSK-300 system with one 300M-byte disk unit remains unchanged, and an additional 300M-byte system is still priced at \$32,500. Other Syfa hardware products whose price tags have not changed include the line's network processor, which costs

uation of computing alternatives.

Mt. Hood's most critical require-

ment was for a responsive, user-

oriented system that would help

it meet production goals and

adapt to changing needs, accord-

ing to Forest Supervisor Dale

Time is our most valuable resource," Robertson said. "We

needed a system that would give

our professionals more time to

develop better ways of meeting

production targets with mini-

Robertson.

\$29,000 with a 64K-byte main memory, and its CRT terminal, which sells for \$2,750.

Page 69

HANDEL H

Among the remaining Syfa system hardware modules, the 300 line/min line printer now costs \$17,00, up \$1,000 from \$16,000, while the price of the family's 600 line/min line printer has jumped \$1,250 from \$19,500 to \$20,750, the spokesman said.

A Syfa 800 bit/in. magnetic tape unit, previously priced at \$8,275, now sells for \$10,550, compared with \$18,000 for the 1,600 bit/in. version, whose cost has risen \$3,000 from \$15,000.

CA also boosted by about 5% the fees for its optional maintenance contracts.

The CSD spokesman attributed the product price hikes to inflation and to the rising cost of labor and transportation.

### Other DSK-32 Features

Elaborating on the DSK-32's features, the source credited the low-end addition to the Syfa systems line with accommodating up to eight Control Data Corp. Phoenix disk units, which reportedly hold 22M bytes of formatted storage. Like the other members of the Syfa system line, the DSK-32 incorporates a disk

(Continued on Page 70)

### Interactive Mini System Improves Management of National Forest

GRESHAM, Ore. - Management of Mt. Hood National Forest's timber harvest, from designing logging systems to keeping track of paper manufacturer's bidding transactions, depends these days on an interactive minicomputer system connecting the forest's seven ranger districts to the supervisor's office here.

In the late 1960s, Mt. Hood, with an annual allowable timber harvest of 364 million board-feet a year, became one of the first forests to use programmable calculators for road design and timber appraisal work.

By the early 1970s, however, a more powerful computing capability was required. So Mt. Hood accessed an outside time-sharing facility interactively with teleprinters and a high-speed batch terminal from the regional office in Portland.

That solution, however, eventually became almost useless as demand for computer time increased among 19 other national forests that also used the regional batch terminal. The system was soon so overloaded that it could no longer meet Mt. Hood's

riculture established a centralized computer center in Fort Collins, Colo. Although the center offered both batch and interactive processing, Mt. Hood still could access the system only in batch mode from the regional office.

"We had great difficulty meeting our production and land use goals with that system," Frank Heaton, Mt. Hood's computer specialist, noted. "The Fort Collins computer was heavily overloaded and operating at peak utilization.

The slow-speed terminals we used caused a bottleneck and there was tremendous competition for the one high-speed batch terminal and seven interactive telephone ports that served the region's 19 national forests," he added.

"We were spending about \$50,000 a year in computer and telecommunications costs, which were rising steadily, and we still did not have a system responsive to users' needs," Heaton said. "At times, we spent several hours simply trying to make connections with Fort Collins.

### **Two-Year Evaluation**

In 1974, Mt. Hood began a two-In 1973, the Department of Ag- year project of research and eval-

### (Continued on Page 74) HP Desktop System Has Assembly Coding

PALO ALTO, Calif. - Assembly language programming, expanded main memory and enhanced Basic have reportedly been combined in a mid-range addition to the Hewlett-Packard Co. line of desktop computer

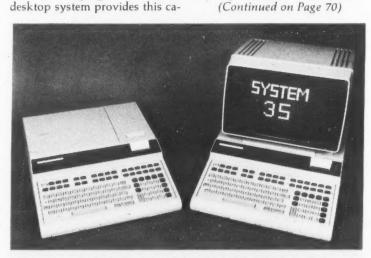
Depending on the application, the System 35's Assembly language capability provides two to 100 times greater performance than traditional desktop computer languages, according to an

HP spokesman. HP also credited the Assembly language feature with allowing programmers to talk to the desktop system's CPU in its own internal language. No other desktop system provides this ca-

Coupled with HP's line of standard interface cards, the Assembly language feature opens the System 35 to applications formerly reserved primarily for minicomputers. Typical tasks for the system include high-speed data acquisition and computation for scientific and engineering projects.

HP supplies its latest desktop system in two versions - Model A, which incorporates a 24-line CRT terminal, and Model B, which provides a single-line, 32-char. display.

Both versions store a minimum of 64 K bytes of read/write memory expandable in 64K-byte in-



HP's System 35 Model A (Right) and Model B Desktop Systems

### Programmable Multiplexer Links PDP-11 to 16 Lines

IRVINE, Calif. - Users can reportedly connect a Digital Equipment Corp. PDP-11 to as many as 16 asynchronous serial communications lines with a programmable multiplexer from Able Computer Technology, Inc.

DMAX/16 consists of two hex boards that link to a rackmounted current-loop or RS-232 interface panel through separate flat-ribbon cables, according to an Able spokesman.

Capable of providing independent program control of all communications lines, the multiplexer accomodates 5-, 6-, 7- or PDP-11 Unibus. 8-bit character lengths. For 6-, 7or 8-bit characters, the unit pro-5-bit characters, one or 1.5 bits.

The multiplexer also offers even, odd or no parity generation or detection and operates in either full- or half-duplex mode. Fifteen programmable transmission rates allow the DMAX/16 to operate at speeds from 0 to 9,600 bit/sec and at 19.2k bit/sec.

16 double-buffered MOS/LSI receivers, the unit assembles incoming characters by converting them from serial to parallel.

Measuring 16 bits wide and 64 words deep, the silo incorporates a register addressable from the

DMAX/16 costs \$5,000 with up to 30% discounts available vides one or two stop bits; for from Able at 1751 Langley Ave., Box 18162, Irvine, Calif. 92714.

### Adapter Lets Users Replace Burroughs Line Printers

SAN DIEGO - Burroughs Corp. minicomputer line printers can reportedly be replaced with competitive models, thanks to a modified version of the Datasystems Corp. Burroughs line printer adapter (BLPA).

Datasystems credited the BLPA with allowing users to replace the Burroughs A-9249 line printer systems with any printer compatible with Centronics Data Computer Corp. or Data Products, Inc. models.

Datasystems' enhancements to the BLPA are said to include the addition of all cabling to a controller and

The BLPA also gives users of printers like the Printronix, Inc. P-300 a combined printing and plotting capability for a cost comparable to that of a Burroughs print-only

Equipped with an optional power supply for special applications, the unit is buffered for parallel data transfers between a Burroughs minicomputer and a line printer.

For a Centronics-compatible printer, the adapter costs \$450; for a Data Products-compatible printer, \$550. OEM and quantity discounts are also available from Datasystems at 8716 Production Ave., San Diego, Calif. 92121.

### **HP Desktop System Uses** Assembly Language Code

(Continued from Page 69) crements to 256K bytes, the largest main storage capacity available with an HP desktop system. The previous upper limit was offered by the System 35's sister product — the HP System 45, which accommodates up to 64K

bytes, the source said.

When fully loaded with read/write memory, the System 35 can manage a 30,000-element array of 12-digit floating point numbers or solve 170 simultaneous equations with 170 unknowns, he added.

Both the A and B models also provide a minimum of 16K bytes of read-only memory (ROM) expandable to 128K enhanced Basic as a standard feature. Because it is also available with the System 45, HP Basic simplifies the transfer of data and programs between the two desktop systems models.

Although System 35 users can specify Assembly language as an option,

desktop system offers HP's

A common programming language also means the systems 35 and 45 share the same software library.

### Fortran-Like Capabilities

Besides accommodating programs written in Ansi Basic, HP's enhanced Basic provides Fortran-like capabilities like subprograms, multicharacter identifiers, large-scale array operations, line labels and output formatting.

Measuring 14.8 in. high, 15.1 in. wide and 19.5 in. deep, the System 35A integrates an interactive keyboard, 1,920-char. CRT terminal and 217K-byte tape cartridge unit that searches at 90 in./sec and rewinds endto-end in 19 sec.

Except for the CRT terminal, the System 35B incorporates the same configuration as the Model A but, because of the single-line display, mea-

sures only 5.1 in. high.

A basic 64K-byte System 35A costs \$9,900; a basic 64K-byte System 35B, \$8,700. Deliveries of both models will begin next January from HP at 1501 Page Mill Road, Palo Alto, Calif.

### **CA Replaces** Low-End Syfa

(Continued from Page 69) controller that supports any disk sys-

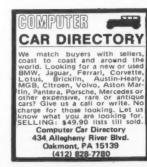
Before the introduction of this common controller, Syfa systems could mix only 80M- and 300M-byte disk

The DSK-32 will compete against systems like the Datapoint Corp. 5500 and 6600, Digital Equipment Corp. PDP-11/34 and IBM Series/1 and System/34, the spokesman said.

Typical users of the system will include companies that intend to build a communications network around at least two high-end 370s, he added.

Like the other members of the Syfa series, the entry-level system consists of a network processor expandable from 64K bytes to 304K bytes, up to 32 local or remote terminals, as many as four spooled line printers, a magnetic tape drive unit and two synchronous communications channels. Prices start at \$42,500 from CA at 18651 Von Karman Ave., Irvine, Calif. 92713.







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### Forest Management Aided By Interactive System

(Continued from Page 69) mum environmental impact.

We also wanted a system that would let us 'make most professional land management decisions at the ranger level - the units closest to the forest without further review by supervisory or regional offices," Robertson added.

The system ultimately chosen to fulfill Mt. Hood's computing needs incorporates a Prime Computer, Inc. Model 300 virtual memory CPU that accommodates up to 31 simultaneous user.

The system also consists of 192K bytes of main memory, a 40M-byte disk unit, one Prime 300 line/min printer and six CRT terminals from a various vendors.

In addition, it provides 10 teleprinters, a 200 card/min Prime card reader and one 9-track, 800 bit/in. tape

The system currently performs more than 30 applications, including preliminary computations that must be made before timber can be harvested and sold. The collection of this data, which often takes up to five years, allows the forest service to determine the feasibility of a timber sale.

It also permits rangers to assess what impact the harvest will have on the environment, according to Robertson.

### **Forest Surveys**

During a forest survey of nearly mature trees, specialists evaluate the harvest's impact, measure and calculate harvestable wood volume, determine harvesting methods and appraise timber worth. This data is later stored in the minicomputer system.

When timber is ready for harvesting, highly competitive bidding on timber sales takes place - often exceeding 200 bids per sale and requiring many calculations. Using remote terminals at the bid site, Mt. Hood can calculate and document the process - a capability it never had before, Robertson said. Before removing timber, specialists

must design sophisticated logging techniques including the use of helicopters, skyline cables and balloons.

Before we had the minicomputer, we submittted our design calculations numbering up to 100 different alternatives and combinations - to the regional office for processing and then waited one to three weeks for data," Robertson said. "Then if the logging design wasn't practical, we resubmitted data and waited another two to four weeks for an answer," he added.

The minicomputer system allows direct interaction and gives the specialists more time to fine tune their logging systems analysis and design, Robertson noted.

### Kit Lets Users Clean Peripheral Components

TARZANA, Calif. - End users as well as DP technicians can reportedly clean magnetic peripheral guides, heads, capstans and other critical components with Innovative Computer Products, Inc.'s CK-25 cleaning kit.

Said to be effective in cleaning difficult-to-reach peripheral sections, the kit provides a dual-ended plastic cleaning wand with an applicator that offers a lint-free polyurethane mitten attached to each end.

The kit also provides a proprietary cleaning solution that major computer manufacturers have approved for cleaning magnetic disk surfaces, according to an Innovative Com-

puter Products spokesman. The solution reportedly removes oils and contaminants from critical areas and leaves no residue.

In small quantities, each kit costs \$15 and is available from Innovative Computer Products at 18360 Oxnard St., Tarzana, Calif. 91356.



**CK-25 Cleaning Kit** 

## The computer controls my company. But how do I control the computer?

90% of the executives we talked to weren't sure?"

Across America, corporate officers expressed a vague uneasiness about data processing. Many said their DP department didn't fully understand the total needs of business. Some expressed skepticism that their long-range computer planning was on-target and on-schedule.

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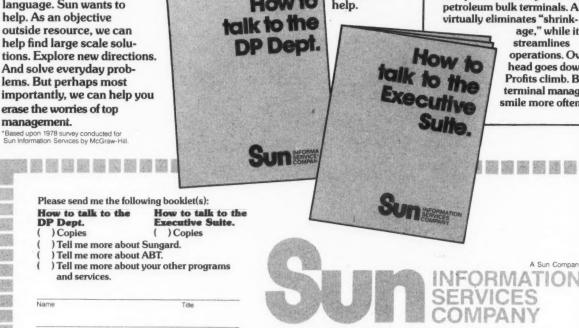
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### Keeps Financial Reports Timely

### In-House Mini Helps Firm Boost Revenues

VAN NUYS, Calif. — In the last five years, a security services firm here has nearly quadrupled its annual revenues from \$10 million to \$37 million, and one of the company's chief officers attributes much of that growth to the organization's decision to replace its machine-driven accounting procedures with an in-house small business system.

Before it installed its current system, California Plant Protection, Inc. (CPP) produced its financial reports with the help of an NCR Corp. 3100 bookkeeping machine built around an integral minicomuter. But with that earlier system, CPP, whose 25 offices in six states provide uniformed security guards to

more than 500 industrial firms, "couldn't get the statistical data we needed for cost control," according to Charles Colglazier, the company's vice-president of finance and administration.

Because of limitations in processing speed, the bookkeeping machine also often forced CPP to wait as long as 20 days to receive its financial reports. By the time the documents arrived they were usually outdated.

Faced with these problems, the firm switched from its NCR 3100 to a Basic/Four Corp. Model 600 minicomputer. "It was like going from a bicycle to a Cadillac," the administrative vice-president explained. Since the conver-

sion to the in-house system, CPP has not only received more timely and detailed accounting data than before, but it has also been able to provide each of its 25 branches with financial reports that cover billing periods ending the previous Friday.

#### **Precise Cost Centers**

This feedback "has allowed us to set up precise cost centers within each operation," Colglazier noted. Every two weeks, the system also generates a separate profit/loss report for each of the company's clients.

Colglazier credited these reports with increasing CPP's awareness of the cost of servicing individual clients and with

allowing managers to spot staffing weaknesses as well as erroneous bidding practices.

Since installing its minicomputer, the security services firm has traced many of its financial problems to guard turnover, overtime pay and insurance fees. With the system, managers can tell when costs in these areas start to exceed historical levels and can take immediate steps to prevent loss.

The computer also generates payroll checks, cost reports, a weekly open invoice register current to the previous Friday and period aging of accounts receivable. "We are able to monitor cash flow and alert branch managers to unusual account delinquencies by plotting accounts receivables against revenues," Colglazier explained.

Reports received and distributed at CPP's corporate headquarters are said to give managers an overview of all operations as well as local responsibility. Moreover, the system allows the firm to distribute reports concerning its largest cost element — guard payroll. These reports compare the average hourly cost of a guard to the average hourly billing rates for a branch. They also list branch overhead costs in cent/hr and indirect branch personnel cost as a percentage of current revenues.

Besides a 24K-byte Model 600, the system incorporates two 10M-byte disk units, three CRT terminals and one 300 line/min printer.

When CPP bought the system in 1973, Basic/Four "was the only supplier of a complete system with the capability we needed at a price that we, as a small user, could afford. Other systems that were around at the time, like the IBM System/3, were too expensive and cumbersome," he recalled. Colglazier expects to operate the current configuration for another two years before upgrading. "We estimate we will double our business in the next five years and at that time, we could set up another computer center at one of our Eastern locations using the ex-

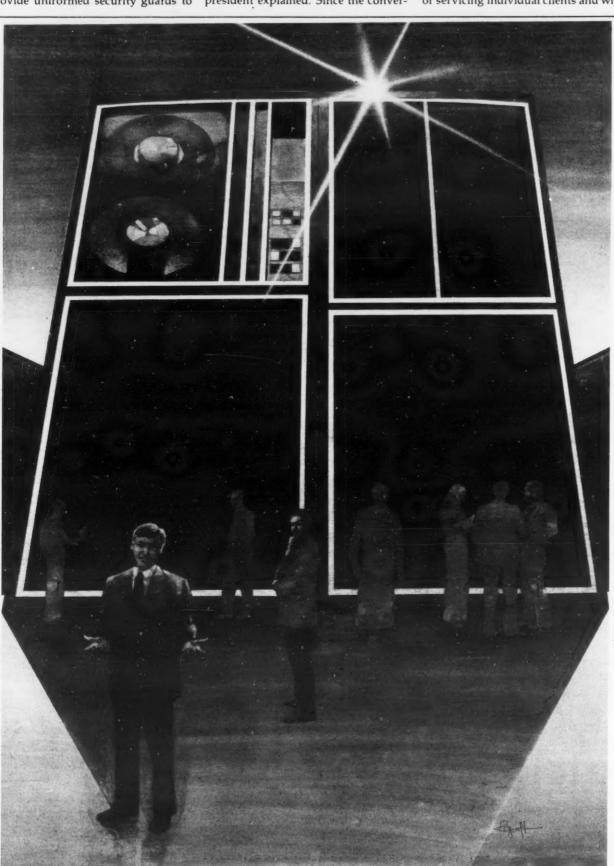
isting computer program."

Within six months, CPP will install minicomputers at each of its branches to interface with the system here.



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### Small System Expands Firm's Business Control

Special to CW ANAHEIM, Calif. – After installing its own small business an electronics firm has improved control of its business operation, simplified the problems of corporate growth and saved as much as \$55,000/year in personnel and outside service costs.

Installed last December, the system has also improved Micronics International, Inc.'s profitability and productivity by reducing paperwork, clerical activities and associated costs. In addition, the system enhances management's planning and control, speeds company reactions to problems and facilitates report production with timely business information, according to Micronics vice-president Larry Resch.

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awareness and control of our business that wasn't remotely possible with our former methods," Resch stressed. Resch stressed. 'And we have it on a daily basis. In addition, we have the means of not only coping with, but fully capitalizing on, our 15% to 30% annual growth

Before installing its own computer system, Micronics, a \$5 million/year manufacturer of electronic fusing devices for defense ordnance contracts. relied on an outside service bureau to manage its accounts payable, disbursements, labor distribution and payroll. All other activities were performed manually by Micronics personnel.

These combined efforts could neither keep pace with the company's workload, nor We now have a degree of deal with its rapid growth.

Detailed tracking of government contracts and reporting on other projects - some of which required 100 or more billing steps - demanded immediate, complete informa-

These constraints drove Micronics to consider alternative DP business methods.

### **Used Management Consultant**

To cope with these problems, Micronics sought the advice of a nearby management consulting and computer services firm, Stuart P. Orr and Associates in Los Angeles. Orr's subsequent study posed three choices: to further utilize a service bureau, to perform remote processing with the parent corporation's mainframe or to install an in-house interactive computer system.

Increased use of the service bureau was dismissed because it was too costly and would not provide the immediate, indepth information Micronics needed.

Cost, again, was the factor that ruled out using the parent's mainframe. Remotebatch processing to the parent system could cost \$3,800/mo to \$6,700/mo. Just installing a batch computer at Micronics would cost from \$3,000/mo to \$4,000/mo.

Buying an in-house small business system appeared to be the most economical and efficient solution to Miproblem. cronics' the company would improve management planning and control and could cut personnel and outside service costs.

Micronics eventually in-Commercial System CS/40 organizations. with interactive ANSIstandard Cobol.

In addition to the 64K-byte CPU, the Micronics system incorporates two 10M-byte cartridge DG/disk subsys-

tems, a magnetic tape unit, a 300 line/min line printer subsystem, four Dasher TP1 CRT terminals, communications chassis and multiplexer, an interactive commercial operating system and a Cobol com-

The four terminals - one each in purchasing, manufacturing, accounting and project control - work from one integrated data base. The system manages inventory control, shipping and receiving, tooling, purchasing, contract administration, quality assurance, production control, accounts receivable, payroll, labor distribution and general

### **Project Monitoring**

Gathering information from all four departments, the system monitors each project's status, cost and schedule in addition to simplifying overall project management. In addition, job/cost budgeting and analysis improve evaluation of

bids and project planning, Resch said.

The system also simulates the effect of changes on project costs and thus allows management to test the feasibility and economics of various changes before committing itself to a definite course of ac-

Since installing the system, Micronics has also speeded writing and tracking of purchase orders, cut inventory investment costs and simplified the clerical chores and paperwork that results when the firm determines a reorder point and economic order quantity.

Among its other tasks, the system helps establish operations sequences and job priorities by due dates — a capability that controls costs and product quality, Resch said.

With our new system," he added, "we now know where we stand in every phase of our business, at any given mo-

### Three-Day Meet to Focus On Applications for Minis

NEW YORK - Minicomputer applications - current and potential - will provide the focus of a three-day conference slated to take place here Oct. 31-Nov. 2 at the Roosevelt Hotel.

To be presented by the American Institute of Industrial Engineers (AIIE), the conference is aimed at users and DP professionals and will explore topics like hardware and software trends and the stalled a Data General Corp. role of minicomputers in small

The conference will coincide with two other AIIE-sponsored gatherings, also to be held in the Roosevelt Hotel. One of the concurrent conferences will cover distributed processing; the other, data communications.

AIIE charges a \$355 registration fee for association members and a \$395 fee for nonmembers. Requests for additional information should be directed to AIIE Seminars, Box 3727, Santa Monica, Calif. 90403.

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### Micro-Based Line Printer Gives Clean, Uniform Type

PALO ALTO, Calif. - A 400 line/- of the routine on a binary display. min dot matrix printer from Hewlett-Packard Co. incorporates a microprocessor-controlled output mechanism that reportedly produces clean, uniform type by equalizing the impact of each print hammer.

Equipped with 16-channel vertical format control (VFC), the 2608A slews vertically at 14 in./sec and assigns each hammer to a permanent position to maintain dot alignment and vertical resolution, according to an HP spokesman. In its basic print mechanism, the 2608A assigns a hammer and drive coil to each of its 132 character positions. The hammers and coils in turn fit into a mechanically balanced print bar suspended on stainless steel fixtures.

Because of its integral microprocessor, the impact line printer also provides self-diagnostic capability that automatically verifies the unit's operational status. Users can reportedly initiate the self-start feature with a control switch or under program control.

If a failure occurs, the fault registers are said to identify the affected portion

As one of its standard features, the 2608A uses a 5 by 7 dot matrix to form a 128-character Ascii set, with optional Cyrillic, Katakana, APL and assorted European character sets available.

Under program control, however, users can double the printer's dot matrix size to 10 by 14, the spokesman said.

Up to 16 character sets can reside within the 2608A, which can combine any two sets in the same line.

Using its programmable VFC, the printer is said to accommodate forms up to six parts thick and 127 lines

An optional sound cover, meanwhile, limits the printer's noise emissions to 68 dba, and a snap-in cartridge ribbon twisted in the shape of a Moebius provides an average print life of 30 million characters, the spokesman added.

The 2608A and its sound cover cost \$9,250 and \$150, respectively, with OEM discounts available from HP at 1501 Page Mill Road, Palo Alto, Calif.

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### **Turnkey for Contractors** Monitors Labor, Materials

HORSHAM, Pa. - Intended for residential and commercial contractors, a turnkey minicomputer system from Complete Computer Systems, Inc. (CCS) is said to help guard against cost overruns and schedule slippages by monitoring labor and materials from suppliers and subcontractors.

Builder I automates job costing, payroll, accounts payable and general ledger for users with little or no computer experience, according to a CCS spokesman.

In addition to a 64K-byte processor, 10M-byte disk unit, 120 char./sec printer and 1,920-character CRT, a basic Builder I configuration includes the Create software package. Create reportedly allows managers to produce custom-written reports from step-bystep instructions displayed on the 19044.

system's CRT screen.

Among its major functions, the system generates job reports that summarize labor, material and overhead charges and highlight variations from original cost projections.

Builder I also tracks materials costs by item, vendor and job and breaks down accounts payable information by vendor, vendor invoice number, item or voucher number, the spokesman said.

In monitoring labor and material costs, the system validates all data entries through CRT-displayed instructional forms

A basic Builder I configuration costs \$42,795 and is available from CCS at 159 Gibraltar Road, Horsham, Pa.

### Bootstrap Included

### Disk Units Replace DEC's

IRVINE, Calif. - A series of floppy diskette systems from the Remex Division of the Ex-Cell-O Corp. are said to replace their counterparts on the Digital Equipment Corp. PDP-11 and LSI-11 series computer systems.

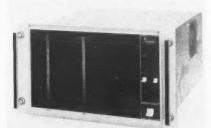
Plug compatible with their comparable DEC models, the Remex 11/11 and 11/12 connect to the PDP-11 Unibus and LSI-11 Q-bus, according to a Remex source. The units also provide built-in formatters, interfaces and diagnostics that make the products transparent to DEC's RT-11 operating

In addition, the 11/11 and 11/12 reportedly offer a read-only memory (ROM) bootstrap as standard equip-

Other features include individual write-protect switches with each drive, busy and error status indicators and automatic reinitializing, the spokes-

The systems provide a utility module named Translate-11, which reportedly permits the exchange of data between an IBM 3740 and any unit supported by the Remex RT-11 operating system.

Prices of the plug-compatible floppy disk system start at \$3,195. Remex can be reached at Box C-19533, 1733 Alton St., Irvine, Calif. 92713.



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#### To Manage Future Growth

#### Mini Speeds Energy Product Firm's Processing

By Marguerite Zientara

CW Staff

TULSA, Okla. — Reacting to a need for on-line, multiprogramming capabilities, an energy equipment manufacturer switched from an IBM System/3 Model 12 minicomputer to a Hewlett-Packard Co. 3000 to help the company manage future growth, reduce order processing time and ensure greater inventory control.

Hinderliter Energy Equipment Corp., founded 27 years ago, has four basic businesses — well-head equipment fabrication, crane blocks production, forged sheave manufacture and metal heat treating.

By last fall, the company was using

the System/3 more than 400 hour/mo. "We just didn't have enough time to run everything," remarked Dave Thompson, the firm's programming supervisor. As a result, the firm decided to scrap the IBM equipment and began to "seriously consider" the HP 3000, an IBM System/3 Model 15 and an IBM System/34 as replacements.

At the time, the System/34 lacked the expandability to meet Hinderliter's growing needs, according to Thompson, and the System/3 did not have an on-line, multiprogramming capability. "The System/3 is set up basically in partitions; you can have one job running in each of usually three partitions and the Customer Information Control

System takes up one partition itself," he explained.

#### Search for New Gear

"My boss had five or six years of computing experience on HP equipment, so he knew what it offered," Thompson noted. "About the time we started looking for new equipment — last October — HP opened a sales and service office in Tulsa.

"Probably if it hadn't opened a service office we might have considered something else because we need the service and it provides excellent service here," he added.

Other capabilities that attracted Hin-

derliter to the HP system were its decentralized processing, its capacity to link to additional computers, its remote telephone access and its ability to link up to 64 on-line terminals.

The HP hardware was installed last December and conversion began early last February. By the first of April, the System/3 was out and the conversion of 700 programs and the operating system was complete.

#### **Conversion Aids**

"We figure that by using HP's utilities and other conversion aids we saved two to three months, at least, in conversion time," Thompson said. For example, HP systems engineers wrote a program that converted the IBM RPG-II to HP RPG-II and recompiled all the programs.

Hinderliter was able to recompile all 700 of its programs in about six hours, Thompson pointed out.

Another conversion aid written by an HP system engineer was a sort function "that configures almost exactly to the IBM sort," according to Thompson. "In fact, you can take the specifications and read them in as a file, and it will sort just like the System/3 would."

The System/3 incorporated disk drives, but all input was on cards, Thompson said. All input now relies on CRT terminals.

"With the HP system, we can have many users all on the system — at the same time — doing different things or even accessing the same file," he explained.

#### 'No Waiting Time'

"There's no waiting time as in batch mode," Thompson said. "All the programmers have their own terminals on which they can key their own programs, compile and test them and actually put them into operation — all on-line and simultaneously."

The HP 3000 Series II Model 6 incorporates a 512K-byte memory, four 50M-byte disk units and a 600-line/min printer. It also has 10 HP 2645 terminals, three HP 2631 printing terminals and two HP 2635 terminals.

"Although our costs for the HP system are approximately the same, we estimate a six- to 10-fold increase in throughput over the previous cardoriented system," according to Michael A. Lasley, Hinderliter's management information systems (MIS) manager.

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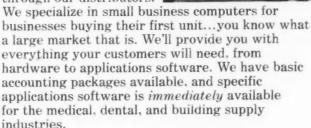
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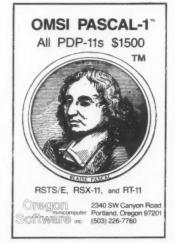
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#### Bevy of Changes Seen for Micro Users

## Isaacson Cites Software Snags

By Ann Dooley CW Staff

DALLAS — The major stumbling block the microcomputer industry must overcome is lack of software, and particularly high-quality software, according to Dr. Portia Isaacson, lecturer and owner of the Computer Store.

The answer to the problem, Isaacson told attendees at the International Microcomputer Exposition here recently, may lie in the emergence of software systems houses, similar to those that sprang up to serve the minicomputer industry in its infancy. These software companies would handle software from the programming to packaging stages, she said.

The micro manufacturers have put their hardware into reasonable shape and even system software appears to be adequate. It is the applications software that is holding back both the home and business user from enjoying the potential benefits of microcomputers, Isaacson stated.

The limited number of applications currently being offered to small businessmen are either the typical standard business applications or those applications relevant to only one specific business, she said. There are also a number of different variations for the same application, such as general ledger, and all are being offered at prices anywhere from \$35 to \$900, she noted.

Programs for home use usually range from \$5 to \$25 and are mostly very basic applications, incompatible with different kinds of



Osborne



McKeever



CW Photos by A. Doole

micro equipment, Isaacson said.

The micro industry has only just begun to realize the amount of software necessary to fulfill the promise of the small computer, according to Isaacson, who added that a much larger choice of programs for home and bus-

iness will be needed.

But the question to be resolved by the industry is where this low-cost software will come from, Isaacson told the attendees.

The solution to this dilemma will probably (Continued on Page 84)

#### Programmers On Way Out?

By Ann Dooley CW Staff

DALLAS — Within the next five years, the computer industry will begin to see the demise of the programmer — that high priest who understands the machine but not the application, Adam Csborne, writer and president of Osborne & Associates, told attendees at the International Microcomputer Exposition here recently.

In a quarter of a century, the programmer function will no longer exist except in research and in analog-to-digital conversion, he told attendees. Computer technology will eliminate the need for the programmer, according to Osborne.

A self-programming computer such as Adam from Logical Machine Corp. is already performing problem-solving and can program by example, he said. When computers become sufficiently developed, the user who understands the application together with the computer will program cost-effective software, he said.

#### Inauspicious Beginnings

Turning his attention to the manufacturers, Osborne stated that "most microcomputer manufacturers are in the industry because they didn't have the sense to stay out," and added that many companies got into the market without really realizing what they were doing.

Many companies "backed into the industry," according to Osborne. A company would advertise a product, cash the checks that were sent in and then build the product. But in spite of these inauspicious beginnings, the industry is providing a worthwhile service because there is a need for these products, he said.

But now, for the most part, the industry has left its shady past behind and is entering a period of consolidation, according to Osborne. Those who are honest will stay in and those who are dishonest will lose out, he predicted.

In addition, many companies will soon get into big financial trouble because they won't know how to manage growth. The engineers who started the companies are now presidents who are not equipped to handle the problems of large companies, he said.

Osborne cautioned the audience not to (Continued on Page 84)

#### Shakeup Imminent: Osborne

By Ann Dooley CW Staff

DALLAS — What goes up must come down and since the microcomputer industry exploded onto the scene, the fallout should be settling soon, Jeffery McKeever told an audience of micro attendees gathered at the International Microcomputer Exposition here recently.

While Adam Osborne addressed the longrange changes in the industry, McKeever, co-owner of the Phoenix Group, a wholesale/retail organization, talked about the present and what he sees coming in 1979.

McKeever's first short-term prediction was a shake-up in the industry. The micro industry has grown up in a period of rapid economic expansion, but how many consumers are cutting back against inflation and this means lots of things could begin happening, he added.

The small retail computer stores, so much a part of the micro scene, will be facing increased competition as Digital Computer Corp. and other manufacturers enter the retail market with their own stores. In the industry's infancy, the users were enthusiastic hobbyists who were willing to wait for equipment or try new products. But the business user is not as willing to compromise and not as willing to hunt for parts or to make his own repairs, he noted.

Because of consumer cutbacks, computer stores will probably not offer as many different product lines as previously or otherwise they may be faced with seeing last

(Continued on Page 84)

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#### Despite Low Attendance

#### Show Crowd Changing, But Attendees Buying

By Ann Dooley CW Staff

DALLAS — Planners of the International Microcomputer Exposition here went out of their way to welcome both hobbyist and small businessmen only to have neither group make much of an appearance.

The anticipated 20,000 attendees never reached the floor of the Dallas Convention Center, and although no official estimate has been announced, attendance probably never climbed to 7,000, according to observers.

Exhibitors were clearly disappointed and could be heard-complaining about the small turnout. "Neither the hobbyists nor the small business people bothered to show up; only the vendors came," one exhibitor commented.

Although almost all of the exhibitors were disappointed with the attendance, several said their sales were still doing well. "A lot of the people aren't just browsing, they're ready to buy," one vendor noted.

The most striking feature of the show was the crowd itself. Gone are the crazy t-shirts, the hordes of hobbyists wildly excited about the newest kit and much of the bells-and-whistles atmosphere of the show itself.

Although some elements of each still linger, the industry is clearly making way for the small businessman. Suitcoats have replaced the t-shirts, and

the products displayed in the booths are being increasingly geared for the business market. The exhibitors readily admitted that business people outnumbered hobbyists at the show, but few vendors seemed to show signs of regret. "The small businessmen are the ones with the money," one vendor noted

Although the display represented a broad mix of products to both the hobbyist and the businessman, small business systems were quite prevalent.

No new products were announced at the show, but exhibitors seemed to attract enough interest from the passerby with their existing lines.

One of the more interesting exhibits

was by the Ford Motor Co., which displayed its new Electronic Engine Control EEC-II system geared to control spark and exhaust gas recirculation and air/fuel ratio.

The EEC-II utilizes a solid-state module incorporating a microprocessor supplied to Ford by Toshiba. Seven sensors are used to determine crankshaft position, throttle position, coolant temperature, manifold absolute pressure, barometric pressure and exhaust gas recirculation valve position.

Using this information, the module calculates spark advance, exhaust gas recirculation flow rate and fuel-flow trim requirements and then sends electrical signals to control the solid-state ignition module, the exhaust gas recirculation valve actuator and an electric stepper motor in the carburetor.

The device will be used in 1979 standard-sized Mercury Marquis and standard-sized Ford LTDs sold in California.

The attendees themselves seemed pleased with the show. One remarked on the good mix of products and added, "The exhibit floor is one of the largest I've been to." And with a smaller turnout, the salesmen were willing to spend more time in explanation and demonstrations, he observed.

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GENERAL & ELECTRIC

#### 'Faire' to Open In Los Angeles

LOS ANGELES — The Third West Coast Computer Faire will be held at the Los Angeles Convention Center Nov. 3-5.

A conference program for the microcomputer user is planned, and an exposition on computing power for the general public. Registration is \$6 for all three days.

For more information, contact Computer Faire, Box 1579, Palo Alto, Calif. 94392.

#### Monitor Aids Real-Time Work With 8080, Z80

SAN DIEGO, Calif. — Oasis Systems has introduced Real-Time Monitor (RTM) program for 8080- or Z80-based microcomputers that can perform multiprocessing.

RTM uses the idea of "task-based processing" to simplify writing for real-time systems, the firm said. The RTM is designed to divide the time and resources of a microcomputer and distribute them among many separate and independent modules or tasks, according to the company. The RTM tasks can communicate, synchronize with each other and schedule time-dependent processes. The RTM can function with or without a real-time clock, the firm said.

RTM is self-relocating and is readonly memory compatible. A package is available with documentation on CP/-M diskette for \$75 from Oasis Systems, 2765 Reynard Way, San Diego, Calif. 92103.



Jose Villorreal and Romeo Vela ponder Radio Shack's TRS-80.



David Kiplinger and Matthew Williams, Dallas junior high students, try Noakes Data Communication, Inc. equipment out for size.



This Dallas duo doesn't intend to miss anything.



The crowds never made it to the micro exposition.

# International Microcomputer Exposition

CW Photo Feature by Ann Dooley



Richard Harsel waits his turn to use the Commodore Pet terminal.



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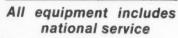


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#### Programmers' Demise Predicted

(Continued from Page 79)

purchasing equipment but rather to examine the financial sheet of the company. At this stage, it is important to be sure the company selected will be in business in six months so the user won't be left unsupported.

Companies that make their products compatible with as many other products as possible will survive and those who continue to remain unique will be overlooked, he said. One of the major problems is the lack of any kind of compatibility among equipment and any company who tries to overcome that problem will be looked upon with favor by the buying public, he noted.

Speaking on the state of the industry, Osborne said that even though the S-100 bus is widely criticized, it has become the industry standard.

Another area of note is the increase in the number of de facto standards, he said. Such standards are not necessarily good, but they are adequate and usable - important considerations.

For example, he said, C-Basic and Microsoft Basic have become de facto software standards, yet Pascal is a better language.

look at the product first and foremost w But quality is not necessarily relevant, according to Osborne, who noted that what is important is the economics of the situation. It's important to stay with what is known instead of scrapping something already accomplished for something new and untried, he noted.

> This also applies to software applications, he added. Very little that is new or innovative has been produced in

micro software for some time. Currently, software consists of trivial programs, specialized custom software and the bread-and-butter business applications, he said.

Osborne predicted an increase in business packages because the businessman has little experience with, or knowledge of, software. These packages will be sold by computer stores, which will begin taking over more of this function, he said.

#### Industry Shake-Up Expected

(Continued from Page 79) year's products on this year's shelf. Already stores are featuring 80% of their products in complete systems instead of the kits that were so prevalent in the

#### **Hobbyists Satisfied**

Before the micro explosion occurred, a demand for the hobby equipment had built up, but that demand is being satisfied now, and the hobbyist is not being seen in the stores as frequently as before. McKeever noted. Service

has become the most important by word of the marketplace, and the attitude has gone from "fix it in a month' to "get it done today."

Users now want financing terms similar to large system contracts, and this creates a problem for the smaller computer companies who need all of their capital to operate. The market is moving from a noncapital market to a capital-intensive market, he noted.

McKeever predicted a sharp decline next year in home computer sales, since consumers are already spending next year's wages.

Although this will change in the distant future, McKeever noted that the small computers will be the first items to be cut from business budgets, too. Only professional users such as doctors or lawyers will continue to buy and use small computers, since they feel the economic pinch least of all, he

#### Software Snags Examined

(Continued from Page 79)

not come from the hardware manufacturers, she said, since they really only want to produce the equipment. Some of the manufacturers have provided software, but only enough to entice the user to buy their equipment. The major manufacturers may be willing to provide high-volume applications, but not the more specialized ones, she added.

Neither should users look to their computer stores for the answer, she said. Computer stores may add to the software market and already have done so to some extent. The stores are also the part of the industry most in touch with customers' needs. The stores themselves need software in order to sell hardware, she said. But stores are faced with the problem of being regional outlets as well as having to deal with many kinds of support problems, she said.

Several publishers of magazines such as Byte or Interface Age have experimented with recordings of software and one publisher even gives away the software to sell his books. But while these magazines are willing to distribute the programming, none have actively solicited new applications, she said.

It is also unlikely that users themselves, especially businessmen, would want to learn programming. They would rather buy a package with modified applications for their business. Isaacson told the attendees, however, that in the future, everyone will be able to program much the same as everyone can write today, but languages will be very different from those currently in use.

Although it is still unclear who will accept the responsibility for providing adequate software, certain problems must be overcome first.

For one thing, software distribution is still limited, she pointed out.

Second, because there is no one major hardware product, there is no standard for software and the user is therefore

faced with attempting to run programs from people who had used different machines The answer to all the problems may very well rest with the software houses, who would manage the entire process, she said.



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# OMPUTER INDUSTR

#### IBM 8100 Characterized as 'Aggressive'

By E. Drake Lundell Jr.

CW Staff

"Aggressive."

"Very aggressive.

"Certainly aggressive." 'More aggressive than we expected."

That's how most industry observers painted the announcement of the IBM 8100 system [CW, Oct. 16].

Both IBM watchers and potential competitors of the system saw IBM's entry into the distributed processing marketplace as a bold move on the part of the industry leader. While the announcement of the 8100 as a replacement for the 3970 systems was fully expected, most in the industry were stunned at the breadth and scope of the announcement, particularly in the areas of memory technology and pricing.

The 8100 - known internally at IBM as the Orbit system - "is the most important single announcement in recent IBM history," according to Aharon Orlansky, analyst with Oppenheimer and Co., Inc. It is important not only because it marks IBM's full-fledged entry into the distributed marketplace, he said, but also because it clearly shows that IBM's business will be shifting away from hardware to rely more on software and services.

"The barriers to entry in the CPU business are very low" since circuitry can today be purchased relatively cheaply and complete computer systems can be assembled easily. "However, the investment needed to develop operating systems is extremely high," he added.

The complete unbundling of software with the 8100 showed IBM expected to

make more money selling the software than the hardware, Orlansky said.

On the hardware side, Orlansky said, the unit is "far cheaper than anything else on the market with a similar capacity,' and its hardware price is about half the cost industry watchers had expected from

The new 64K-bit memory chips show IBM is going to be very aggressive in the area of circuitry, he added, but warned IBM may be capacity-bound for the next few years in producing such devices.

At the same time, IBM is working on multilayer ceramic (MLC) logic circuits, he said, which should provide a major jump in the capacity of logic.

The announcement of the 8100 will have its largest impact on the mini (Continued on Page 88)

#### FCC Questioning AT&T

#### Future Competitors Unclear On ACS

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. - Vendors who would have to compete with AT&T's proposed Advanced Communications Service (ACS) are not even sure what that service is.

That was the gist of comments and questions about ACS received by the Federal Communications Commission (FCC). The comments prompted the commission to request AT&T to answer about 150 questions on the ACS proposal.

Richard Pullen, an attorney with the domestic branch of the FCC's Common Carrier Bureau, said the general nature of AT&T's original filing and the many requests from vendors for further information on the service resulted in a letter from the commission to AT&T on Sept. 18.

The overall schedule for comments and replies by AT&T and all interested parties together with the FCC's Computer Inquiry already assure that the ACS proposal will not be acted on until at least next February, according to Pullen.

Moreover, AT&T has already notified the FCC that it may not be able to respond by the Oct. 18 deadline set in the commission's letter of Sept. 18.

DP manufacturers and industry associations are particularly concerned that ACS might include substantial DP services, he

ACS, described by AT&T as "protocoltransparent," is a proposed packet-switched network designed to enable incompatible DP equipment and networks to communicate. The service would operate over Dataphone Digital Service (DDS) lines provided by the company's Bell System.

Several DP industry groups immediately

raised objections to ACS [CW, July 24]. Comments filed last month with the FCC by the Computer and Business Equipment Manufacturer's Association (Cbema) and the CCIA, among others, expressed concern that DP services would be a large part of

AT&T is forbidden from offering DP serv-(Continued on Page 92)

#### Semi Growth Predicted to Dip Next Year, But Will Recover

By Marcia Blumenthal

CW Staff

**BOSTON** Semiconductor industry growth will dip sometime next year, but the stall will in no way resemble the recession experienced by semiconductor makers in 1974 and 1975, according to an industry analyst speaking here recently.

Various forecasts have placed industry growth at 22% this year, with a decline of 10% to 12% next year, but industry participants should not take a dim or short-sighted view of the future potential of the industry.

Benjamin M. Rosen, a leading electronics industry analyst and vice-president of Morgan Stanley and Co., Inc., thinks the semiconductor industry should grow 15% yearly until the end of the century, with annual revenues reaching \$87 billion by that

These and other predictions were offered by Rosen in a lively presentation at the Semiconductor Equipment and Materials Institute's (Semi) first East Coast dinner meeting held here recently.

#### Semiconductor Industry Outlook

Concentrating on the semiconductor industry outlook rather than on growth prospects in the semiconductor equipment suppliers' sphere, Rosen, for the most part, (Continued on Page 86)

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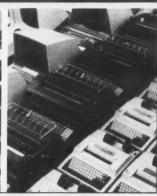
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#### Pertec Division to Support Milacron's George Series

LOS ANGELES — Pertec Computer Corp. will provide maintenance and support for Cincinnati Milacron, Inc.'s "George" series of small business systems for the next five years, G.O. Harmon, vice-president and general manager of Pertec's service divisions, said.

Service for the approximately 600 installed systems will begin immediately. "Milacron's field service engineers will be invited to join Pertec's service force to provide effective, responsive maintenance and support for those systems," according to Harmon.

Milacron decided to discontinue ac-

Milacron decided to discontinue actively marketing its George series last July [CW, July 17] and to support systems only to its existing distributors for the next two years.

Prior to that decision, Milacron intended to sell the line to CSD International Corp., a company to be composed primarily of former Milacron employees [CW, May 29]. Negotiations for the sale broke down when Milacron refused to extend the 41-day

time limit for the sale's consummation. After the announcement, distributors of the George line were bitter — many of them because they had invested in developing software for the system, others because they heard of the decision only one day before the news was published in *The Wall Street Journal*.

#### No Manufacturing Plans

Frank Hesford, manager of the Computer Group, indicated that the company at this time has no plans to manufacture the George line beyond the two-year period fixed last July.

Some of Pertec's Service Division employees will be trained to support the George line, therby increasing service availability to Milacron's customers, Harmon noted.

Service revenues are estimated at more than \$500,000 for the first year of the five years covered in the agreement. Harmon added that the agreement could be extended, depending on the life cycle of the installed base.

#### Up to 12% Semi Growth Dip Forecast for Coming Year

(Continued from Page 85)

showed how the economics of the semiconductor industry would affect Semi's constituents.

Aside from making growth projections, Rosen talked about how integrated circuit (IC) makers would react to an industry deceleration and discussed the threats of international competition and future opportunities for the semiconductor industry.

Rosen pointed out the last expansion in the semiconductor industry — occurring between 1970 and 1974 — continued for almost 3-1/2 years. Noting that the industry has shown cyclical sensitivity, he said it has not been expanding for about 3-1/2 years since that last downturn, so a deceleration in the near future would not be a surprise.

However, Rosen noted that for the first time, managers of semiconductor firms are admitting that cutting capital spending was a major mistake made in 1974 and 1975. The 10 major semiconductor firms, according to Rosen, increased their capital spending budgets 31% in 1977, and a 51% increase in capital spending is projected for 1978.

Moreover, he said the industry is no longer plagued with lead time, double inventory and excess ordering problems as was the case in 1973 and 1974.

#### Message to Managers

Rosen's message for managers of semiconductor companies — facing an upcoming deceleration period with possible dips in earnings — is to manage their companies as if they were privately held. He advised managers to focus less on the short term and more on the electronics explosion expected to take place in the early to mid-1980s.

However, Rosen did note profit margins of semiconductor firms have been declining despite the spectacular boom IC makers are experiencing this year.

Pointing to the smooth 20% yearly growth of the IC industry in the past, Rosen said the market for ICs is highly

elastic and that trait will lead to future industry demand.

Technological advances — which permit increasing chip density — are fueling the market's elasticity because the price of a chip is remaining stable or even falling regardless of the density. As chips have increased in density from 1K of random-access memory (RAM) to 64K RAM, Rosen explained, the per-chip price has been about \$4, and there is "no near-term limit to device density."

#### 'Home-Grown Trend'

While Rosen believes long-range growth prospects for IC makers are healthy, he did not dismiss the growing nationalistic trend in various countries which is causing "home-grown" semiconductor industries to develop. Semiconductor industries are burgeoning in France, Germany, China, USSR, the UK, Japan and Korea, Rosen noted, and these countries believe they will become Third World nations unless they have stronger IC industries.

Rosen does not consider the Japanese IC industry as the most serious threat to U.S. makers. "U.S. design will be the world industry standard, and the breadth of the Japanese product line is not that great," he said.

On the domestic scene, computer makers such as Data General Corp. and Hewlett-Packard Co. have established captive IC companies, but the trend, Rosen claimed, should not present a threat to the industry. This move on the part of computer companies should help them meet their own needs for small volumes of ICs — or customized products — which they cannot easily obtain from semiconductor makers, who prefer to produce large-volume runs.

The age of the IC has arrived, with semiconductor companies selling microprocessors in large numbers to various companies for use in products from blenders to telephones.

#### Contract Add-On Lifts Sanders' IBM Business

Associates, Inc. has received an additional \$2.3 million contract add-on from IBM for production of interactive computer graphics equipment for the IBM 3250 graphics display system.

With the add-on contract, has now awarded **IBM** Sanders more than \$20 million since the initial production contract of approximately \$18 million was agreed upon in

NASHUA, N.H. - Sanders November 1977. That was the month Sanders successfully completed development work in cooperation with IBM under an agreement reached in January 1977 [CW, Jan. 31,

> In the January agreement, Sanders consented to drop its antitrust suit against IBM which was pending in the U.S. District Court in New Hampshire. IBM, in turn, agreed to pay Sanders \$4 million for

applications of Sanders technology to be used in future IBM products.

Payments of \$3 million were also agreed upon for "certain minimum production commitments," according to joint statements issued by the firms at the time of the settlement.

In addition, IBM agreed to purchase certain products from Sanders inventory while Sanders agreed to grant IBM "a nonexclusive license to certain Sanders patents."

The lawsuit filed in January 1975 by Sanders charged that IBM's actions against Sanders' terminal products violated antitrust laws. At the time, industry sources believed Sanders had one of the best chances of proving predatory marketing practices on IBM's part because its case revolved around the relatively narrow CRT sphere.

Shortly after the settlement

with IBM, Sanders sold to Harris Corp. its Data Systems Division, which consisted of the products involved in the antitrust suit.

The equipment covered in the IBM contract was formerly part of the Military Data Systems Division at Sanders, later renamed the Information Products Division.

Further add-on contracts are expected from IBM, a Sanders spokesman said.

#### Contracts

Tri-Data has signed a \$2 million contract wth Teradyne, Inc. covering the purchase of more than 400 Cartfile magnetic tape systems, spare parts and Series 1000 magnetic tape cartridges.

PRC Data Services Co. has been awarded a contract by the U.S. Marine Corps to provide test and evaluation, systems engineering, systems requirements analysis, programming and other computer-oriented All work will be done at Camp Pendleton, Calif. The twoyear contract with a one-year option has a potential value of more than \$5 million.

The Software Co. has entered into a contract with Republic Gymsum Co. to design, develop and install an interactive software package on a Univac BC/7 system.

General Datacomm Industries, Inc. and the Bell System Purchased Products Division have entered into a national agreement to facilitate the purchase of General Datacomm's Netcon-5 Network Diagnostic Control System.

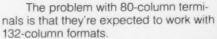
Integrated Software Systems Corp. (Issco) has been awarded a contract from ICI Americas, Inc. of Wilmington, Del., for Issco's Disspla graphics software system.

The Computer Communications Group (CCG) of the TransCanada Telephone System has received a contract worth more than \$2 million annually from Loto Canada. CCG will provide the data transmission facilities for Loto's weekly game beginning late this fall.

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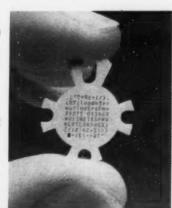




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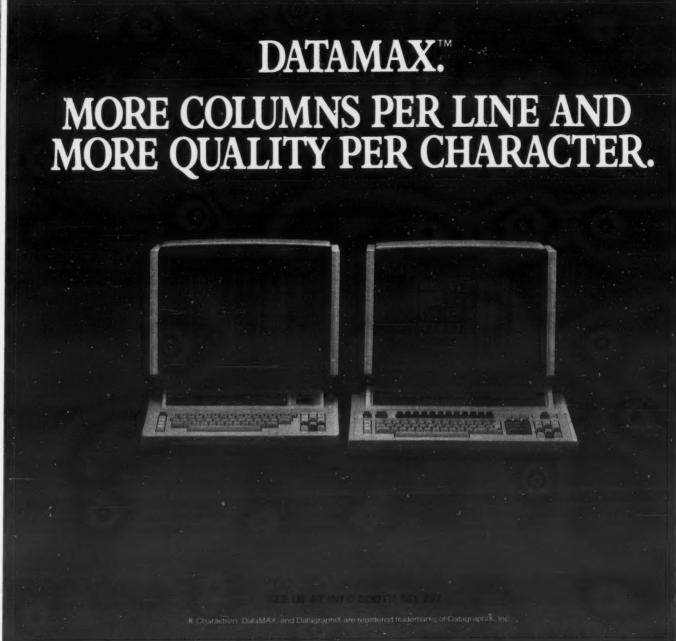
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#### Observers Describe IBM's 8100 as 'Aggressive'

(Continued from Page 85) makers, Orlansky indicated, because it could lop off a portion of their upper end busi-

In the past, IBM has been weak in this part of the business both for stand-alone and distributed processing applications, according to Or-lansky. He believes the 8100 will close that gap and affect the marketing plans of mini firms.

However, a spokesman for Data General Corp., while admitting that the IBM move was considered aggressive, pointed out that the 8100 sys-

tems will not be delivered for at least another year.

A year is a long time in this business. We usually don't announce systems until they are ready for delivery," he said, indicating the mini makers may have plans to use larger memory chips and be more competitive against the 8100 than their current product lines suggest.

#### 'A Shocker'

Robert Fertig, head of the Technology Analysis Group at Advanced Computer Techniques Corp., called the 8100 announcement a "shocker,"

even though many of the IBM moves had been predicted.

What was shocking was the amount of new technology and the aggressiveness of the pricing structure, he said, noting, for example, that while IBM's work on 64K chips was well known, few expected their announcement so early.

Pointing to the 8100's wide range of capabilities, Fertig predicted it will be strong competition for small business system makers and the intelligent terminal makers as well as the more main line minicomputer companies.

Harry Edelson, a computer

and Lambert, Inc., said it is significant that the 8100 system now gives IBM's Data Processing Division (DPD) an entry-level product to sell.

Because the product is marketed by DPD rather than the firm's General Systems Division, there will be a lot more marketing muscle behind it, he believes.

But while it can be used as an entry-level system, Edelson said he expected most of the 8100's applications to come in large distributed networks, where the DPD salesmen have not really had a competitive product. "I'll bet the DPD salesmen can't wait to get their hands on this for their large accounts," he commented.

The 64K-bit chip certainly indicates the direction IBM is taking in the memory market,

analyst with Drexel, Burham he said. He added, however, that the 64K chips apparently are not fast enough at this point for large mainframe applications.

The pricing of IBM's older memory available for the 8140 processor, is considerably below the cost of the same memory for the 370 line, he noted. On a 1M-byte basis, the 8140 memory would cost \$49,920, even though it is not available in such large increments for the 8140.

At the same time, IBM is selling the same type of memory to 370 and Series 30 customers for \$11,000 per 1Mbyte increment.

"I expect we will see IBM drop the price of mainframe memory by at least half in the near future," Edelson said. Such a price reduction is "long



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#### Wespercorp, **DDS** Talk Of Merger

ANAHEIM, Calif. - Wespercorp and Diversified Data Systems, Inc. (DDS) have announced their intent to merge, with the surviving company to be Wespercorp.

Randy Knapp, president of Wespercorp, said interest in the merger developed when Wespercorp evaluated and later installed a DDS business management system.

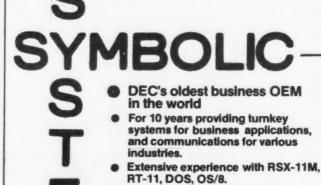
The system is an on-line, data base-oriented manufacturing control system called Summit which provides electronic management of sales order entry and purchase order tasks, inventory control, cost accounting and standard accounting functions which are all finalized into a general ledger module.

#### Relocating

When the merger is finalized, DDS will become a semi-

products introduced.

The new division, Wesperline, manufactures cabinets, racks and related equipment for minicomputer components from other manufacturers.

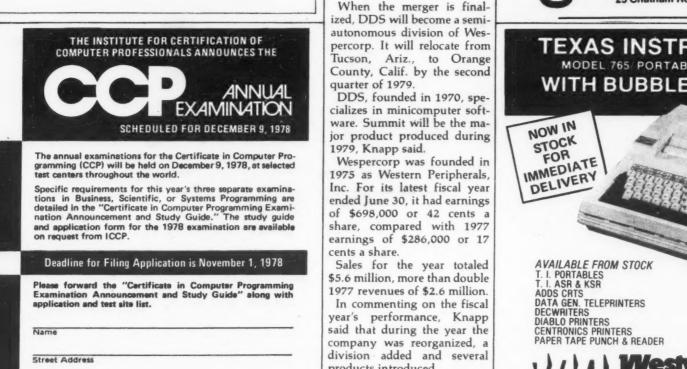


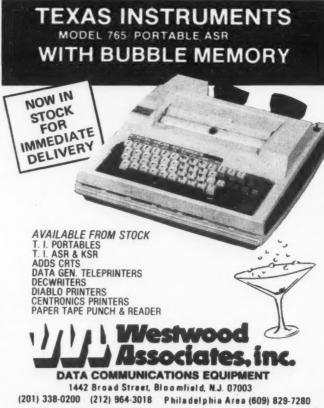
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COBOL programmers into reflective telecommunications programmers," says Ron Clevenger of Gilmore Steel.

CLEVENGER: We have never had a problem upgrading to a more powerful NCR system, but our transition from an NCR Century 201 to our NCR Criterion is the smoothest yet.

NCR's CHAMBERS: As I recall, you turned your computer room over to us one morning at 9:30, and by 6:00 that evening we had the Century disconnected and the Criterion up and running.

CLEVENGER: We worked the regular shift that night with the same software we had used on the Century. There were absolutely no conversion problems. The only noticeable change was a 30 percent improvement in productivity.

<u>CHAMBERS</u>: You can attribute your easy transition to NCR's Migration Path Engineering. We protect your investment in software even when you go from one generation of equipment to the next.

<u>CLEVENGER</u>: It may be software rather than hardware, but I am just as impressed by our transition to TRAN-PRO, NCR's communications monitor.

<u>CHAMBERS</u>: It's a new offering. NCR has been using TRAN-PRO in its own operations for some time, but you are one of the first customer-users.

<u>CLEVENGER</u>: That is the surprising part. We were aware of its newness and expected some problems. But during the three months since the tests were completed, we have not had a single problem. It's an excellent product.

<u>CHAMBERS</u>: And it's done a lot for your programmers, too.

CLEVENGER: It has. On the basis of our experience, I can say that TRAN-PRO can turn a competent COBOL programmer – after a month of training – into an effective telecommunica-

tions programmer. One who can produce a 7K module of coding in two days.

<u>CHAMBERS</u>: And you are looking forward to the next step.

CLEVENGER: We will soon be adding NCR's Virtual Resource Executive – VRX. We need virtual memory. And we want Online Programming Development. NCR has the operating software to meet our requirements.

In the NCR office near you, there is an account manager like Dean Chambers who knows your industry and knows NCR systems and software.

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NCR Complete Computer Systems

Ronald M. Clevenger (left) is the Data Processing Manager of Gilmore Steel Corporation, Portland, Oregon. Dean Chambers is NCR District Manager. You'd probably like to switch over from your IBM 3270's to more versatile equipment, but you're not ready to bite the bullet. Well, there's a complete terminal system that will make the change painless because it's 100% IBM plug compatible. A terminal system with features you won't get from IBM for years, if ever. A terminal system that can easily provide special functions. A terminal system that's software modifiable to future changes in network line protocol requirements. The terminal system is the Trivex Plus 70. And in addition to having all the functional capability approunced by IBM. Trivey 3270 compatible units

in addition to having all the functional capability announced by IBM, Trivex 3270 compatible units offer you those valuable extras that can make your job a whole lot easier.

Maybe you're thinking: "That's fine, but what makes you think my company would be interested? Can it meet the unique requirements of my 3270 application?"



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The Target Test		
CHECK ONE	YES	NO
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2. Does a single device failure take your complete channel down?		
3. Will remote communication speeds, switch selectable, up to 19.2KBS improve your network efficiency?		
4. Do your programmers need more infor- mation displayed to efficiently develop and debug software?		
5. Are there one or more special functions you need to make your job a lot easier?		
*		

#### Results

Score 20 points for every "yes" answer. If you scored 20 points or below, you've got nothing to complain about. Don't change a thing.

If you scored 40 points, you may not make the switch yet, but an inquiry is in order.

If you scored 60 points, call us and ask for application information.

If you scored 80 points or over. BULLSEYE! Call us right now. We'll send a salesman out to see you.

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# Don't Replace Your 3270s Without Taking The Trivex Target Test.

#### DPD, GSD Openly Competing

#### Debut of 8100 Means War for IBM Divisions

By E. Drake Lundell Jr.

CW Staff

With its recent 8100 product announcement [CW, Oct. 9], IBM moved firmly from a policy of "contention" between internal product programs to one of open competition between its major divisions.

The trend is sure to continue. The next major round is expected later this month, when IBM's General Systems Division (GSD) announces its Pacific minicomputer product, which will compete with the lower end of the Data Processing Division's (DPD)

"We realize we are certainly overlapping with GSD," a DPD spokesman said at the time of the 8100 announcement. "We feel this is a healthy devel-

In the long run, he said, the move will provide users with a greater variety of systems from which to choose and will benefit users by allowing them to pick the best system for their needs.

With the competition among the divisions, users will now have another source to check out when looking for computer sytems - another source within IBM.

While most analysts feel IBM's full strategy is not crystal clear, they do feel IBM is certainly moving toward a General Motors-like structure in which all divisions compete aggressively with each other.

computer line, much like the 8100 competes with GSD products.

IBM is not only allowing its two divisions concerned with computers to compete with each other, it is also apparently allowing them to go after business that was previously the preserve of the Office Products Division (OPD).

While most analysts feel IBM's full strategy is not crystal clear, they do feel IBM is certainly moving toward a General Motors-like structure in which all divisions compete aggressively with each other.

In the past, IBM's policy was one of internal "contention" between various product programs. For example, had there been six minicomputer development programs under way at one time, top corporate management would have evaluated them, chosen the best and assigned it to the proper marketing division. The other projects would be essentially scrapped.

During this period, the "turf" of the various divisions was also clear: GSD handled small business systems and minicomputers; DPD handled medium- and large-scale systems; OPD handled typewriters and other office equipment. DPD was - and is - the largest division, followed by GSD and OPD.

With the advent of distributed processing, however, equipment from GSD began to compete with DPD gear for some orders. In other cases, users needed equipment from both divisions in order to meet their application needs

For a while there was a great deal of internal competition and DPD salesmen almost refused to cooperate with GSD. IBM then began splitting commissions so DPD personnel would be better rewarded for sales they made of GSD equipment.

#### **Conscious Decision**

But with the 8100 announcement, IBM is clearly letting DPD invade the GSD's turf - and GSD is expected to retaliate later this month with Pacific, which will initially range in size up to the level of large System/3s, but eventually will have the power of a 370/-158, clearly moving GSD into the realm of medium-scale systems.

IBM has apparently made a conscious decision to move in this direc-

General Motors follows the same type of strategy. That corporation really doesn't care if Chevrolet, Buick or Oldsmobile sells a customer a car - as long as Ford doesn't get the order.

IBM is not only opening up competition in the computer area, but also in the office products area.

Along with the 8100 announcement DPD also introduced the 3730 office communications system, which is essentially a text and word processing system with some DP capability.

In a stand-alone mode, the system should supply competition to some of the automatic typewriting equipment already marketed by OPD and certainly for planned clustered word processing systems from that division.

At the same time, the system can be interconnected with 370 mainframes so users can transfer text among various 3730 systems in electronic mail applications, giving it a bonus compared with presently available products from its sister division.

In the past, several industry analysts indicated that IBM might move in this direction - independent and competing divisions - so its structure would permit it to be split up, should it be

#### **Analysis**

forced to negotiate a consent decree with the government or encounter an adverse judgement in its decade-long antitrust battle with the government.

However, most now see the move motivated less by possible antitrust considerations and more by the need to make its sales staff more competitive.

By playing off the divisions against each other, competition will be increased in the IBM world — but the result of the competitive situation should be an increase in revenues to the company as a whole, they believe.

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#### CCIA Elects Officers, New Members

ARLINGTON, Va. - The Computer and Communications Industry Association (CCIA) elected a new chairman of the board, four executive vice-chairmen and seven new members at its annual meeting held in Minneapolis recently.

With the election, the total number of corporate members is 60.

The new chairman of the board is Harold E. O'Kelley, chairman and president of Datapoint Corp.

The four new vice-chairmen are Jesse Aweida, chairman and president of Storage Technology Corp.; John E. Jones, chairman and president of Cummins-Allison Corp.; Raymond P. Kurshan, chairman and president of Management As-

sistance, Inc.; and Robert Tetherow, executive vice-president of Applied Magnetics Corp.

Newly elected corporate members and their representatives to the association include Computer Communications, Inc., represented by Raymond High, chairman and president; Cray Research, Inc., represented by John Rollwagen, president; Information Magnetics Corp., represented by Michael Faherty, chairman; Magnuson Systems Corp., represented by Paul Magnuson, chairman and chief executive officer; Multiple Access Ltd. of Canada, represented by President John McCutcheon; Qantel Systems Corp., represented by Douglas

Baker, president; and Western Digital Corp. represented by C.W. Missler, chairman and president.

Nominations of new officers are made by the 14-member executive committee staffed to represent companies of all sizes from the various sectors of the industry. The nominations are then presented to the full membership for election.

The next CCIA meeting will be held at the Breakers in Palm Beach, Fla. The agenda has not yet been finalized, but a spokeswoman for CCIA said the meeting will include two technology forecast sessions a presentation by Harry Edelson, vice-president of research for Drexel Burnham Lambert, Inc.

#### Rivals of ACS Raise Questions **About Service**

(Continued from Page 85)

ices under the terms of its 1956 Consent Decree with the FCC. Cbema also pointed out that ACS

would put AT&T in competition with itself because the company makes its DDS lines available to private companies to create their own data networks. As a result, the association said, AT&T would have an unfair advantage over its competitors.

Cbema President Vico Henriques, in a letter to Sen. John Glenn, chairman of the Senate subcommittee on federal services, wrote that ACS "appears to go well beyond the provision of communications common carriage," which AT&T is allowed to offer.

#### Other Than Common Carriage

It is the concern of our association that much [of ACS] appears to be other than common carriage and infringes on the provision of DP services," Henriques said in the letter, a copy of which was filed with the FCC. He added that ACS "has the strong overtones of an electronic mail system," which, he said, would pose a substantial threat to the U.S. Postal Service.

The CCIA was more direct in its comments to the FCC. ACS, the associations said, is "AT&T's major attempt at entry into the DP field to date.

The CCIA said it is extremely concerned about potential anticompetitive effects of ACS on firms already providing communications services.

The association said ACS presents "three distinct levels of service offerings; a packet-switched data communications service, an electronic message service and a data processing service.

#### Vague and Unclear

The ACS proposal is very vague and unclear, according to the CCIA, which recommended the FCC hold a major inquiry to determine exactly what kinds of services AT&T intends to of-

The Independent Data Communica-Manufacturers Association (IDCMA) joined Chema in raising the question of cost accounting for ACS. Answers to questions about the relationships of ACS facilities and equipment with those facilities and equipment used for DDS are clearly necessary," the IDCMA told the FCC.

Pullen noted that the FCC's Computer Inquiry, scheduled for completion by the end of the year, could have a great effect on whether or not the ACS offering is approved by the commission



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#### THREE TUTORIALS

Software Methodology

An assessment of software development methodology and the techniques available for each developmental phase, this tutorial includes an overview, sections on modeling, design, and implementation, and a series of case studies. Presented by C. V. Ramamoorthy of UC Berkeley and Raymond T. Yeh of the University of Texas at Austin. (Catalog Number 211; 350 pp.) Price: Members, \$12.00; non-members, \$16.00

Distributed Data-Base Management

This tutorial presents an overview of both relational and distributed database management systems and covers approaches to distributed query processing, concurrency control, and data-base reliability. Presented by James B. Rothnie, Jr., Philip A. Bernstein, and David W. Shipman of the Computer Corporation of America. (Catalog Number 212; 260 pp.) Price: Members, \$10.50; non-members, \$14.00

Microcomputer Programming and Software Support

Microcomputer applications, programming practices, software tools, programming languages, and cost/performance tradeoffs in microcomputer programming are surveyed by Imsong Lee, founder and president of Digital Electronics Corp. and professor of electrical engineering at UC Berkeley. (Catalog Number 213) Price: Members, \$9.00; non-members, \$12.00

#### **COMPSAC 78 PROCEEDINGS**

Includes over 150 papers on software generation methodology and applications. Among the topics covered in the 49 conference sessions are software design, testing, reliability, and standards; data-base design; and security and privacy. (Catalog Number 196) Price: Members, \$22.50; non-members, \$30.00

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IFFF-CW

#### Zaire Now Has 'Veritable DP Constitution'

By Bohdan O. Szuprowicz

Special to CW

KINSHASA, Zaire — September marked the first anniversary of the signing of the order for the creation of a Presidential Information Science Service (SPI) in the Central African Republic of Zaire. It was yet another high-level order regulating the development of DP in Zaire signed into law here by President Mobutu Sese Seko Kuku Ngbendu Wa Za Banga.

Since November 1972, when the Service de l'Informatique au Zaire (Zaire Data Processing Service) was created, also by presidential fiat, there have been several orders outlining development and control of DP budgeting, hardware acquisition and utilization, establishment of a state data bank and even supply of software and training services. This series of presidential orders has now come to resemble a veritable DP constitution of Zaire.

Although in mid-1976 there were only 52 computers reported operating in Zaire, DP developments in this country are important because it is regarded as a crucial state in the development of tropical Africa. It is also a leading French-speaking African country and many of its innovations may be followed in other African nations with similar language and trade affiliations.

The Marxist rebel invasion of the mineral-rich Shaba province in May 1978 also focused world attention once again on Zaire and its future development plans and prospects.

In fact, DP end users all over the world, even those without any interest in foreign affairs, could not help being affected by the recent developments in Zaire. Although the country is best known for its large copper deposits, Zaire also produces about 60% of the world's cobalt, which is widely used in permanent magnets for electric motors. There are probably 30 to 40 electric motors in a typical DP installation—in various disk drives, tape transports, printers and readers and wherever information-bearing media have to be moved automatically.

Because all the industrialized countries, except the Soviet Union, must import most of the cobalt they need, disruptions in Zaire had an immediate effect on cobalt prices. Those who had a recent need to replace a burned-out motor are probably already aware of the jump in motor prices as a result.

The Zairean national orders regulating DP development in that country are nothing new or unexpected. In fact, the government has been a pioneer in DP use, and one of the first and

#### Qume to Become Part of ITT

HAYWARD, Calif. — Qume Corp. and International Telephone and Telegraph Corp. (ITT) have reached an agreement in principle whereby Qume will become part of the ITT system.

Qume will retain its corporate name and current management but will become part of ITT's Business Systems and Communications Group.

Under the terms of the agreement, 4.7 million shares of ITT stock will be issued in exchange for Qume shares on a one-for-one basis. largest computer centers in Zaire was established by the Ministry of Finance. Originally equipped with an IBM 360/40, that center was upgraded to an IBM 370/155 as early as 1972.

To this day, IBM is by far the major supplier of DP hardware in Zaire with only minor inroads being made by minicomputer manufacturers such as Hewlett-Packard Co., whose equipment is going into a documentation center of the World Trade Center here.

#### Early Application

Control of customs duty payments was one of the first applications for Zairean computers. This is understandable because foreign trade is an important segment of the economy and source of revenues. Interestingly, the Ministry of Finance also used its computers to simulate what the diplomatic spending of Zairean embassies abroad should be which turned out to be considerably less than the actual bills presented to the government by its ambassadors.

With such promising applications, perhaps it is not surprising that the Zairean government took a liking to its new-found toy and decided to keep control of DP as a means of learning more about its own economy. Early in 1976, the Ministry of Finance was the moving spirit behind the first DP congress in Zaire that assembled as many as 500 participants at the Intercontinental Hotel here. Several recommendations resulted from "round-table" discussions held on that occasion and most have now been signed into law by presidential order.

Basic to all of those is probably the order dating from May 1976 eatablishing a Permanent Council for Information Science in Zaire (Copiz), which became a specialized administrative energy agency responsible for advice and suggestions, preparation of programs and plans, and presentation of any "useful proposals concerning any matter which is directly or indirectly connected with informatics in the Re-

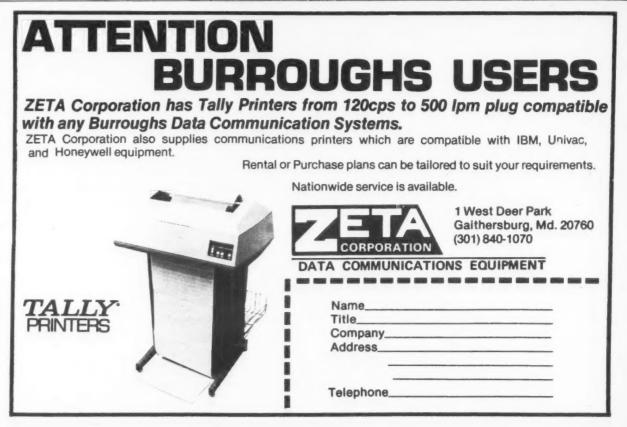
public of Zaire."

Needless to say, the purchase of computers in Zaire is subject to authorization by the Copiz organization, which also has the power to order access to a particular computer center by outside end-users. This is all in order to make better use of scarce resources such as computers.

Acquisition of training services and utilization of software are also controlled by Copiz regulations, and the Ministry of Telecommunications is being urged to work closely with the DP watchdog agency.

So if you're headed for Zaire with your special fact-finding data base software, you better plan on touching base with Copiz as a start. Preferably you should seek out a member of the Copiz Secretariat because their tenure expires only "when a member dies, resigns or loses status . . . " for which he was appointed. So sayeth the presidential order signed by Mobutu, general of the armed forces.





#### Supershorts

Bank of America has announced the name change of its automated teller service. The service, formerly known as "Bank Ameriteller," is now known as "Versatel."

International Data Corp. (IDC) has announced the opening of a West Coast editorial bureau to serve its seven computer industry newsletters. The bureau will open Nov. 1 at IDC's Los Angeles office.

Russ Kelly has announced the formation of SOTA DP Associates, Taylors, SC. The firm will specialize in programming, design and consulting activities for Honeywell, Inc. systems users.

Data Terminals and Communications (DTC) has announced the sale of \$250,000 worth of its Taskmaster small business systems to Telema, A.B. of Sweden, which will act as DTC's exclusive distributor in that country.

Data Processing Power Corp. (DPP) has announced that Data Supplies, Inc. of Atlanta has signed an agreement to market DPP's Powermobile line of products throughout the Southeast

Two new distributors have been added to Fujitsu America, Inc.'s Component Sales Division: Matex International Inc. of Portland, Ore., and J.&S. Electronics of Dallas, Texas.

Pertec Computer Corp.'s PCC Service Division has signed a contract with Unitech, Inc. to provide third-party service for Unitech's line of remote batch/data entry terminals. This service will supplement Unitech's own network of service representatives in maintaining UT-1 and UT-2 remote batch terminals at end-user locations nationwide. PCC Service has also signed a two-year agreement with Printronix, Inc. to become one of the organizations providing field maintenance for Printronix' P-300 and P-150 line printers.

Rand Information Systems, Inc.has renamed the division that provides data services to casualty insurance companies and brokers. Formerly known as Montgomery-McDonald, Inc., the division is now known as Rand Insurance Systems.

Six representatives have been added to Digital Communications Associates, Inc.'s worldwide marketing system.

#### U.S. Continues Positive Balance Of DP Trade

WASHINGTON, D.C. — The U.S. continued to register a positive balance of trade in data processing and business equipment in the second quarter of 1978, according to figures released here recently.

Second-quarter figures made public by the Computer and Business Equipment Manufacturers Association (Cbema) showed a 22.7% increase in the balance of trade compared with the same quarter in 1977.

In dollars, the second quarter of 1978 showed a positive balance of \$678.8 million while the same period in 1977 had a positive balance of \$553.5 million

Although exports for the second quarter rose 31% from \$940.3 million to \$1.232 billion, imports were up 43% from \$386.9 million to \$553.4 million.

Imports of DP equipment rose 72% during the quarter, reaching \$52.5 million from \$30.4 million in 1977's second quarter. DP equipment made up the major product area contributing to the rise in imports, Cbema said.

Exports of computer and business equipment rose from \$769.3 million in the second quarter of 1977 to \$990.7 million in this year's period.

Contributing significantly to that improvement, Cbema said, were increases in two categories — DP equipment and parts. Between the two quarterly reporting periods, DP machines, peripherals and related equipment exports increased by \$81.1 million while exports of parts and accessories for DP equipment increased by \$140.3 million.

The Cbema statistics, compiled from U.S. Department of Commerce data, indicated the ratio of exports to imports was 2.23.

#### Inforex to Make Beehive Devices

BURLINGTON, Mass. — Inforex, Inc. has acquired the manufacturing rights to the Model B-800 and Model B-103 terminals, designed by Beehive International to Inforex specifications. Inforex will now manufacture the terminals, which it has been buying since entering into an OEM contract with Beehive in September 1976.

Under the original agreement, Inforex purchased the Beehive terminals for use in its System 7000, its intelligent terminal product line aimed at the distributed processing market.

The acquisition of these manufacturing rights permits Inforex to have closer control over the production and the future evolution of the System 7000, that vendor said.

# Now there's more than one way to disseminate your bauds.

See "Data Communications Networks" in our November 27th issue.

Time was, the data communications user had a limited choice between using the public switched telephone network, or leasing private lines. But recent data communications developments are rapidly allowing the user to configure more flexible networks, with greatly increased transmission efficiency, and easy interfacing of terminals and computers to the network.

Computerworld's November 27th Special Report takes a close look at data communications networks, and how they are rapidly making distributed processing technically feasible (as well as affordable). Edited by Ron Frank, Data Communications Networks will examine standards for evaluating and establishing effective networks, with articles by vendors and users on design, control and maintenance of the various available networks. We'll also be talking about:

- Terminal selection getting the most work out of the right terminal.
- Private line vs. public data networks how users can best utilize either [or both] systems.
- Switched networks choosing between circuit switching, message switching, and packet switching.
- Configuring in the '80's microwave transmission and satellite links.

Whether you're presently involved with data communications, or just looking, our November 28th Special Report will be of special interest to you. And if you market data communications products or services — this is a good place to get the word out. Ad closing date is November 10, and your *Computerworld* representative can give you all the details. Or, to reserve space, call Terry Williams at (617) 965-5800.



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#### **Executive Corner**

• Thomas R. Ambler has been promoted to senior vice-president of the Systems Division at Kran²ley & Co. Louis C. Cozens has been named vice-president of system assurance at the firm.

 Peter R. Geddis has been named sales manager of the Los Angeles district at Southern Pacific Communications Co.

• Thomas L. Campbell has been named vice-president of marketing at Rapidata, Inc.

F. Jack Miller has been appointed vice-president of marketing for Burndy Corp.'s new Termac Division.

• Justus F. Lowe Jr. has been named executive vice-president at Softech, Inc. Other appointments include Dr. Jorge E. Rodriquez as senior vice-president and general manager of the company's Federal Systems Division; Ben Goodwin as vice-president of government marketing; and Robert J. Kalil as vice-president of administration and finance.

• Dick Bright has become vice-president of ICL, Inc.'s Americas Operations and in addition will become president of ICL, Inc.

• Melvin W. Redmond Jr., Dr. Roland E. Webber and Harold S. Hemstreet have been elected vice-presidents by the board of directors at Perkin-Elmer Corp.

• John N. Lemasters has been promoted to the post of corporate vice-president, group executive at Harris Corp.

• Leonard A. Palmer Jr. has been named vice-president of the Data Processing and Systems Division at Remote Computing Corp.

 Dr. Gyan C. Jain has been appointed vice-president of systems engineering at Documation. Inc.

 Earl Wantland has been named to the board of directors at Floating Point Systems, Inc.

• Robert A. Leonard has joined Threshold Technology, Inc. as chairman and chief executive officer. He succeeds Edward Smith, who has become chairman of the board's financing committee.

 Gerald R. Cicconi has been appointed president and chief executive officer af Data Access Systems, Inc.

• Dr. Robert C. McFarlane has been elected to the board of directors of Scientific Software Corp.

 Richard E. Pufliese has been appointed vice-president of manufacturing at Durango Systems, Inc.

• Larry S. Goldfarb has been promoted to vice-president and sales manager at Computer Resources Group, Inc.

Mel Synder has been promoted to sales manager, western area, at Zilog, Inc.
 Douglas Broyles has become

vice-president and general manager of the firm's newly formed Systems Division.

• William F. Tilley has been named president of National Computer Communications Corp.

Dhruba Sen has been promoted to director of applications at Tesdata Systems Corp.

 Clayton Rea has been named branch manager in Pittsburgh for U.S. Datacorp. Bruce Bonnet has been named Oklahoma City branch manager for the firm.

 Dr. Earl D. Jacobs has been appointed corporate staff vice-president and Douglas L. Cutsforth has been named

general manager of Computer Automation, Inc.'s Industrial Products Division.

• Jerry Brandt, president of Byte Industries, has been elected to the board of directors and promoted to chief operations officer of Logical Machine Corp.

 Ray Ball has been appointed director of marketing at Able Computer Technology.

 Kevin M. Mahan has been named western regional manager for Rapidata, Inc. Max V. Kupferman has been appointed district manager of the firm's Los Angeles district sales office.

• Juan Sprindys will be re-

sponsible for sales in the Midwest for Plessey Materials Corp. King Hsu has been appointed research and development engineer at the firm.

 Thomas A. Brancati has joined Dynamic Sciences as vice-president and director of electronic systems.

 Ray Kristiansen has been named Western regional sales manager at PerSci, Inc.

 John F. Gifford has been made a vice-president of Intersil, Inc.

 Michael M. Hoeffler has been named manager of the Direct Access Radar Channel program at Raytheon Co.'s Equipment Division.  Colman Daniel has been named component marketing director at Hamilton/Avnet Electronics.

 William A. Krepick has been named product manager for Rolm Corp.'s Telecommunications Division.

• William H. Krause has been appointed to the new position of sales administration manager for semiconductor products at Hughes Aircraft Co.'s Microelectronic Products Division.

• Don Leach has been appointed marketing manager of test equipment for Interstate Electronics Corp.

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#### TI Offering 64K RAM Samples This Month

DALLAS - Sample quantities of a TI claimed. The 5V operation reduces 64K dynamic random-access memory (RAM) priced at \$125 each will be available late this month, according to Texas Instruments, Inc. The firm has scheduled volume production for the first quarter of 1979.

Organized as 64K by 1, the TMS 4164 is expected to be the first available single 5V 64K dynamic RAM on the market, a spokesman said. It comes in a 16-pin, 300-mil standard dual-inline package, complying with Jedec standardized pin-out requirements and allowing upward compatibility with the 16K dynamic RAM.

The TMS 4164 single 5V power supply design is TTL-compatible, offers considerably lower power dissipation and is more immune to system noise,

the effective electric field across gate oxide, offering higher system reliablity, the spokesman added.

In addition, a compact layout and optimized design/process combination for 5V-only operation results in improved performance, he asserted.

Access times range from 100 to 150 nsec maximum with minimum cycle times of 200 to 250 nsec. Power dissipation is 200 mW maximum or 3 microwatts maximum per bit.

#### Reduced Power

Comparing the 462 mW power dissipation of the 16K RAM at 375 nsec cycle time, the total maximum power dissipation of the 64K RAM is reduced by 60% with improved cycle times mils is a significant contributing factor

while bit density is quadrupled, TI said, claiming this advancement allows practically an order of magnitude power per bit improvement.

The TMS 4164 features a 256 cycle

### **Products**

refresh with a 4 msec maximum refresh period, as a result of the lower power dissipation. This refresh period is a 100% improvement over the 2 msec refresh period of current 4K and 16K RAMs, the spokesman noted.

The small chip size of 33,000 square

to lower production costs and improved reliability, he said.

Because of the TMS 4164's refresh compatibility with the 16K RAM, the basic refresh controller timing does not require major changes. The only provision required is for an 8-bit refresh counter/multiplexer when upgrading to 64K from a 16K system.

Also contributing to higher system operating efficiency is a 1.3% to 1.6% refresh overhead time, compared to 2.4% on the 16K RAM, TI said.

#### **Essentially Identical**

Two clocks, row address select (RAS) and column address select (CAS) control the gating of the 8-bit addresses so timing characteristics are essentially identical to the TMS 4116 16K RAM. Row address set-up time is 0 nsec; hold time, 15 nsec.

Column address set-up is -5 nsec and RAS/CAS spacing is 15 nsec and 50 nsec. This allows the system designer a full 35 nsec interval to change addresses and bring CAS low, without expanding access time beyond 150 nsec, TI said.

Photomasks for TMS 4164 volume production will be manufactured with electron-beam equipment to control geometrics to better than .25 microns. Projection printing will also be employed to avoid direct contact between photomask and wafer, TI said.

Additionally, geometrics at several critical levels of the TMS 4164 are 2.5 to 3 microns, demanding use of positive photoresist for resolution and delineation control as well as dry processing at critical levels.

TI can be reached at Box 5012, Dallas. Texas 75222.

#### LSI Circuit **Drives 32 LCDs**

NEWPORT BEACH, Calif. - A CMOS large-scale integrated circuit that acts as a smart peripheral to a microprocessor to drive up to 32 liquid crystal display (LCD) segments has been introduced by Hughes Aircraft Co.'s Solid-State Products Division.

The LCD driver, designated HLCD 0438, can drive any standard or custom parallel-drive LCD display - either field effect or dynamic scattering of 7-, 9-, 13- or 16-segment characters, decimals or symbols.

It offers lower cost, higher reliability and smaller size than the several 4000/series discrete devices - shift registers, OR gates, latches, oscillators - that it replaces, Hughes claimed.

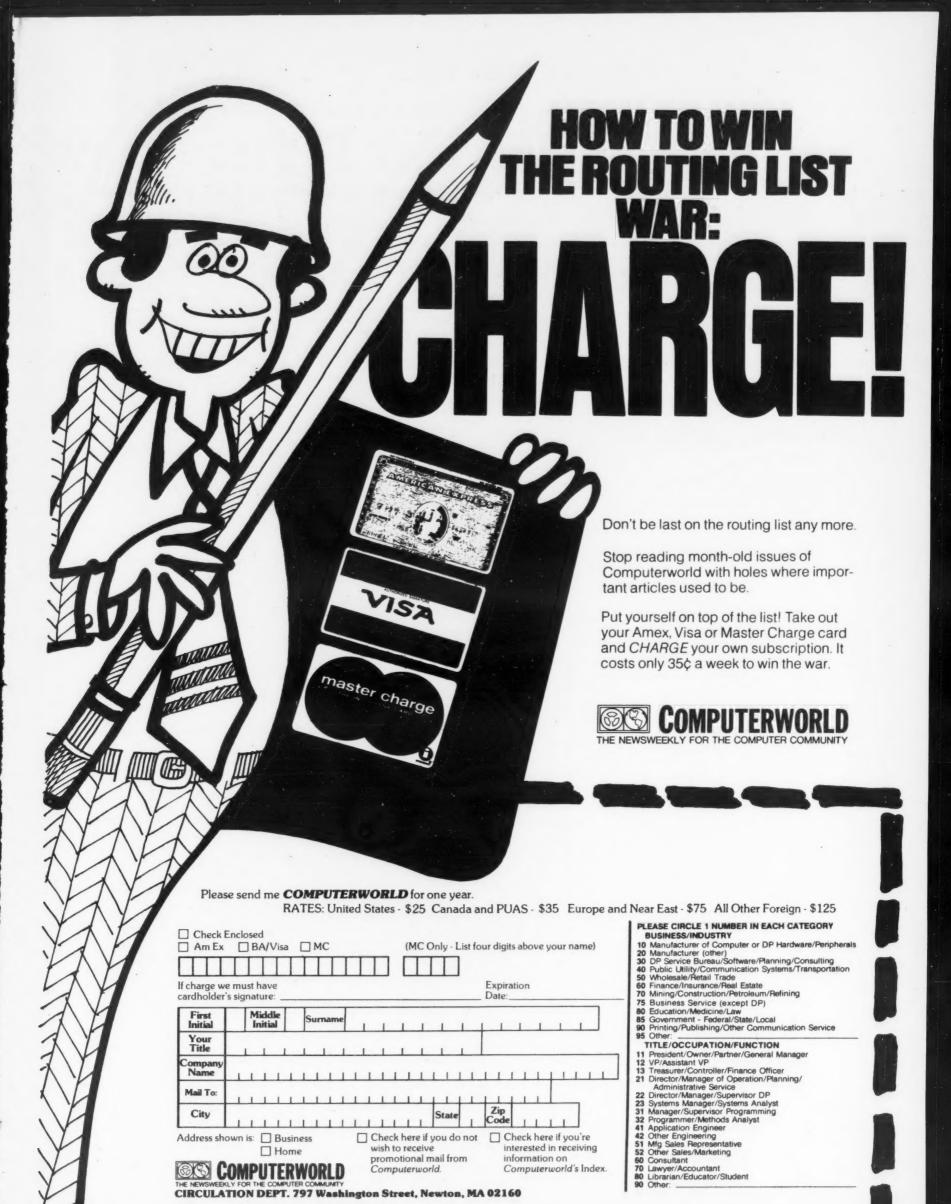
#### Only Three Lines

The circuit requires only three control lines because of its serial input construction, a spokesman said; inputs are CMOS-, NMOS- and T2Lcompatible.

Several HLCD 0438s can be cascaded, and the required LCD waveforms can be supplied by the user or can be generated internally by means of an on-chip oscillator. The unit, packaged in a 40-pin dual in-line package, costs \$4.45 each in units of

Hughes' Solid-State Products Division is at 500 Superior Ave., Newport Beach, Calif. 92663.





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If you can meet our needs and are interested in discussing your role at Hughes and how we can meet your needs, please send your resume to: Hughes - C&DP Employment - 63LA CLN, Ground Systems Group, 1901 West Malvern, Fullerton, CA 92634.

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You should be equally comfortable in an electrical engineering, as well as a software development environment and be ready to apply both disciplines to this important function. A knowledge of assembly language and experience with LSI and semiconductor devices is required.

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We need several individuals at most levels to participate in a wide variety of customer specific and standard software projects such as banking systems, data entry, airline reservations and similar real-time terminal applications. You will have the opportunity to work in diverse areas and to interface extensively with users' technical personnel.

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You will undertake responsibility for the design and implementation of operating subsystems, and contribute to the overall requirements definition of the operating system. You must be capable of implementing thorough knowledge of controlled file access, multi-level directory systems, and sequential, random, and index sequential access methods.

The successful candidate will have a Bachelor's degree in computer science and 3 years experience. You must have participated in the design and implementation of an operating system, and a working knowledge of data base systems and requirements is desirable.

#### Verification

You will have responsibility for ensuring that a quality systems product is developed. Specifically, you will develop, construct, and execute test programs and participate in design, code, and specification reviews of new software products. In addition, you will help monitor the building of the system in order to rapidly identify schedule inaccuracies and conflicts.

Required are a strong technical background in systems software and at least 2 years experience in developing and/or testing systems software. Your most recent experience should be in the area of compilers or operating systems. A strong background in mathematics is desirable.

#### Senior Technical Writer

We need a technical writer to produce internal and external system documentation using information obtained from formal design discussions and specifications. Additionally, you will help to establish documentation plans and identify documentation requirements as well as coordinating production of completed manuals.

You must have a strong technical background in systems software and at least 2 years experience in technical writing for a computer manufacturer or software vendor.

#### Leader, Operating System Development

Employing your strong technical knowledge and good managerial and leadership skills, you will undertake full responsibility for the design and implementation of the operating system. You must have at least 6 years experience including prior participation in the design and implementation of an operating system. A working knowledge of contemporary minicomputer-based operating systems is desirable.

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This individual will write firmware programs for new state-of-the-art microprocessors. You must be hardware and software savvy, supercompetent, and intelligent. You must be a perfectionist who can spend hours squeezing a single line of code out of two hundred. You need not have experience in this area, only the certainty that you can handle this demanding position.

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Providing digital capability in a product support capacity, you will interface closely with design engineering, quality assurance, customer service, and production to construct innovative solutions to unique problems.

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Director of University Computing
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The Director will have primary responsibility for policy and planning of future directions and development of all computing at The University's academic computing center and its administrative data processing unit and staff coordinating relationship with the University Hospitals data processing unit. The directors of the academic and data processing centers who have responsibility for day-to-day operations of these centers will report to the Director of University Computing. The Director will exercise supervisory responsibility for the financial planning and the efficient operation of these centers as well as for the services provided through distributed computing to various research and educational laboratories both on and off the campus.

The Director will be responsible to the Vice President for

The Director will be responsible to the Vice President for Finance and University Services in insuring effective operation of the two centers. He or she also will be responsible to the Vice President for Academic Affairs, the Vice President for Educational Development and Research and the Vice President for Finance and University Services who will sit jointly to provide policy guidance concerning the use and availability of computers in support of the University's academic mission. The Director also will receive advice and policy guidance from a University-wide computer services committee.

Characteristics

#### Characteristics

Characteristics

Required characteristics include demonstrated leadership in an academic, research or high technology industrial setting; knowledge of advanced computer technology; demonstrated capability for working and communicating effectively with diverse groups; and an understanding of financial and management systems in large diversified organizations. Desirable characteristics include experience in the management of large computer systems; academic computing experience; and qualification for a faculty appointment.

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Please send resume and supporting materials to:

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Minimum Qualifications: College graduate with at least five years of data processing experience, two years of which must be in data base design or administration. Preference given to experience in IMS, DL/I, DC, and large systems. Successful candidate will control data base activities at LSU and will supervise the activities of two junior DBA's. The salary is very competitive with a 3033 support computer. Send confidential resume to:

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#### Re-Opening Position For **Computer Center Director**

Computer Center Director

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- Development support systems
- Software development tools
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#### Reliable Systems Technology

- Formal specification & program verification
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- Test and validation

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- Data base management systems
- Real-time data collection/ synthesis
- Local network architectures
- Network protocols
- 1 to 200 MBPS bandwidth

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Software Test Specialist - you will break new ground in design of test methods for provably secure systems. Using your familiarity with modern software testing methodologies, you will interact with the systems design team. As a result, you will become familiar with formal mathematical specification techniques for

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Programming Language Specialist - your knowledge of modern compiler-building technology and formal languages will be used in the evaluation and development of systems programming languages for use in support of our reliable systems technology efforts.

Computer Facility Manager - your experience in systems configuration, maintenance, and operations will be used as you manage the Software Engineering Laboratory that presently consists of two large PDP-11 configurations running PWB/UNIX.

If you have a BS, MS, PhD or equivalent related experience in one or more of the technology areas we've discussed, we'd like to talk with you. At Western Development Laboratories you will receive the professional recognition you deserve, excellent compensation, and one of the best fringe-benefits packages in the industry.

#### WHAT ARE YOU WAITING FOR?

Please send your resumé and salary requirements to: Professional Employment, Department PF-92. If you wish to call, our toll-free number outside of California is (800) 227-8433; in California, call collect (415) 494-7400, ext. 6601. U.S. Citizenship is required for most positions.



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Greyhound Computer Corporation's rapid expansion has created additional opportunities for professionals with strong background and experience in 370 Systems/ Software to provide sales support in our Boston or San Franciso regional offices.

Qualified candidates will be interested in expanding their technical skills and possess the potential to become a Computer Leasing Sales professional.

As the nation's largest computer lessor and a whollyowned subsidiary of The Greyhound Corporation, Greyhound Computer enjoys a unique position in the computer industry. For more information on this unusual opportunity to combine your talents with our rapid growth.

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OR send your resume, in confidence to: Personnel Manager; Greyhound Computer Corporation; Greyhound Tower; Phoenix, AZ 85077.

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Computer Architects - BS/MSEE and 3-5 years of experience in the definition and development of Minicomputer Systems. Will be a principal participant in developing a new family of computer systems.

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**Microprocessor Design Engineers** - BS/MSEE with detailed CPU architecture and software background. Position entails logic design simulation and prototyping.

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Digital Logic & Circuit Design Engineers - BSEE and some experience in Logic and Circuit Design, including a familiarity with DTL, TTL, CMOS, etc. Salary to \$25,000

Computer Interface Engineers - BSEE with experience in Logic Design. Will work on team designing interface circuitry between Digital Computers and between Digital Computers and different types of Hardware. Salary to \$25,000

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PROGRAMMING

#### Data Communications Programmer/Analysts BURROUGHS B6800

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We need a systems professional who can develop the advanced software to support our expanding communications network. Someone who can not only install this new Burroughs system – but implement a nationwide on-line order entry and accounts receivable system using GEMCOS and DMS-11.

You'll be involved in developing and streamlining a message control system with GEMCOS and RJE.... and in the selection, installation, and monitoring of all terminals, distributed minicomputers, and communications equipment.

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Salary is fully commensurate with experience. Growth potential is all you'd expect from a world leader in the electronics industry.

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Individual Growth and Development Two to six years experience in Systems and/or Programming is necessary. H-600/6000/66, COBOL, IDS, TDS & GMAP desirable but not mandatory. Experience in Teleprocessing and On-line Data Base applications would be an asset. A four year college degree is preferred. Excellent salary structure and fringe benefit program. Please submit resume with salary history in confidence to Personnel Manager:

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COMPUTER CENTER Data Processing Assistant Director for Planning and Development to participate and assist in the planning of future hardware, software and network needs for a large IBM computer installation. In addition, will manage Senior software and communications specialists through developmental projects. Also, to be a liaison with satellite RJE users to determine their short and long term needs.

Minimum requirements are 5 years Data Processing experience of which two years must be management experience. In addition there must be two years experience on a 370 - 158/168 class computer with a medium to large communications network. Familiarity with current state-of-the- art hardware, software and telecommunications is desirable. Experience with Project Management and Results Management is desirable.

Management is desirable. This position provides 5 weeks vacation per year and opportunity to further education via tuition waivers. Salary is open and commen-surate with experience. Closing date for receipt of resumes is November 1, 1978. Starting date is after December 1, 1978. Send resumes and salary progress to:

Director of A.C.C. University of Illinois 370 RRB, Box 4348 Chicago, Illinois 60680

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Gifford-Hill & Co., Inc., a NYSE company, seeks Programmers for the corporate office in Dallas. Positions require a minimum of two years programming experience utilizing COBOL in business applications. Prefer candidate with degree in Business, Accounting or Computer Science.

Excellent opportunity for professional and personal growth. Salary commensurate with qualifications. Forward resume and salary history to:

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Major Midwestern management consulting firm is seeking an experienced applications programmer to have a major responsibility for the implementation of a new Data Base Management System. Minimum qualifications include a bachelor's degree and two years experience in applications programming using COBOL. DBMS experience desirable. Salary commensurate with qualifications. Excellent benefits. Submit your resume including salary history and requirements to:

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Knowledge of components of
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minicomputers. Will develop Strategies in areas of minicomputers
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Sensor bases systems — 6 + yrs, Technical D P field. 2 + yrs, IMS or CICS in complex computer environment. Will develop, implement and maintain minicomputer software & hardware components. Develop & implement specialized interface software, Interface with Engineering & Development personnel determining requirements & implementing systems on minis. \$19K to \$25K.

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Data Processing Department

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#### Compiler Design For New **Product Development**

Our client, a highly successful New York Stock Exchange listed computer systems manufacturer seeks several innovative and experienced Compiler Designers.

Successful applicants will contribute directly to an extremely high-level design effort to produce COBOL and FORTRAN compilers for a state-of-the-art new product line in an attractive Southeast location. A minimum of one year of directly related Compiler Development experience, or similar academic achievement is required, together with appropriate experience in systems software or significant programming projects. MS or PhD, in Computer Science, Mathematics, or Electrical Engineering preferred, but not mandatory-appropriate experience is most important. Project Leader positions also available.

Compensation is open based upon experience. Company offers excellent benefits, advancement potential, assumes all fees and expenses and is an equal opportunity employer.

Qualified applicants are invited to contact Mr. Robert Kleven, in strict confidence, at (617) 861-1020, or to submit confidential resume with current salary information. All replies will be acknowledged. For those who find it inconvenient to call during working hours, our office will be open until 7:30

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These positions involve heavy interface with customers, the field sales force, product engineering and product marketing management. Responsibilities include providing technical assistance to customers and the field sales force, conducting benchmarks, generation of product literature, and trade show assistance.

Growth potential is to marketing management with responsibilities for particular market segment and the related marketing activities.

Interested? Mail resume to Gould Inc., 3631 Perkins Avenue, Cleveland, Ohio 44114, Attention: Dale Richmond, or call him collect at 216/361-3315, Ext. 315. We are an equal opportunity employer M/F.



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To be responsible for all instructional, research and administrative computer services. Current environment includes IBM 370/135 DOS/VS, CICS - 18 terminals, DEC, PDP 11/70 - 20 + terminals (Environment may change).

Required: A minimum of 6 to 8 years progressively responsible experience in data processing, programming, or operations including

Master's Degree is required, however, a Doctorate in Computer Science, Business Management, Mathematics or a related field is preferred.

Salary is dependent upon qualifications and experience.

A review of all applications will begin November 1 and continue until the position is filled.
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Control Data Corporation has career growth opportunities in pre-sale, post-sale and consulting located throughout the United States.

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(Opportunities in Boston; Birmingham; Chicago; Detroit; Fredericksburg; Livermore; California; Los Angeles; Miami; Minneapolis; New Jersey; Philadel-phia; Seattle; St. Louis, San Francisco Bay Area; Tulsa, Oklahoma; Washington, D.C.; and Teheran,

#### System 370, 360 or OMEGA with DOS, VS, VSI, SVS or MVS

(Opportunities in Dallas, Milwaukee, New York, and Springfield, III. and Los Angeles)

#### CYBER 18 or other minis with 1700 MSOS, RCOS, ITOS or OS (Opportunities in Los Angeles, Minneapolis, New York City, San Antonio, and Washington, D.C.)

#### PDP-11 with RSX/11M

(Opportunities in Minneapolis, Sunnyvale, California; and Livermore, California. UNIX Operating System background a plus for the opening in

or have extensive assembly language on any of the above computers.

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#### PUBLIC NOTICE

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All positions require Degree plus 3 or more years experience at a senior level in Information Systems. Data Base experience a strong plus. Send resume, transcript, and references to:

Mr. Michael E. Schouest, Director Bureau of Management Information Systems State of Louisiana Department of Education P.O. Box 44064

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data processing

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ANALYST

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Responsible for overall design, development, implementation and maintenance of fully integrated IMS data base systems. Experience in development of Manufacturing/Material and Logistics systems desirable. Will work closely with user departments as well as other data processing functions.

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Responsible for writing, testing and implementing COBOL programs as part of a development team comprised of Programmers, Analysts and Data Base Administrators. Includes both on-line and batch applications. Minimum of two years COBOL experience required. On-line and/or IMS batch experience desirable.

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Responsibilities include software implementation, problem resolution, preventive maintenance, special projects and user/vendor interface. Four or more years large scale system experience with knowledge in one or more of the following areas required: MVS, JES, TSO, IMS or VTAM/NCP.

These positions include a comprehensive benefits package and salary commensurate with your experience and ability. For immediate consideration, please submit your resume including salary history and requirements to:

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We require at least 2 years data processing training experience plus 5 or more years in DP operations, systems or programming in an IBM installation. Demonstrated ability to effectively communicate with all levels of management and students in a classroom environment is

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This individual will be responsible for course development and presentation in both the classroom and self-paced learning environments. Will provide assistance in the preparation of training materials, will review products and provide recommendations for

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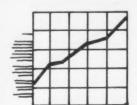
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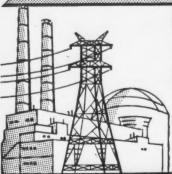
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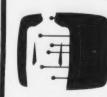
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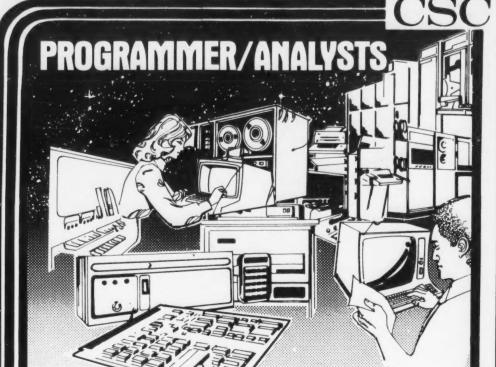
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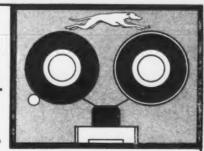
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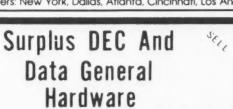
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## 370/145

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	6982	2nd Selec. Chan.
	7855	3215 Adaptor
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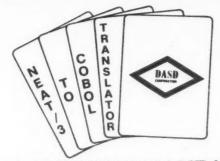
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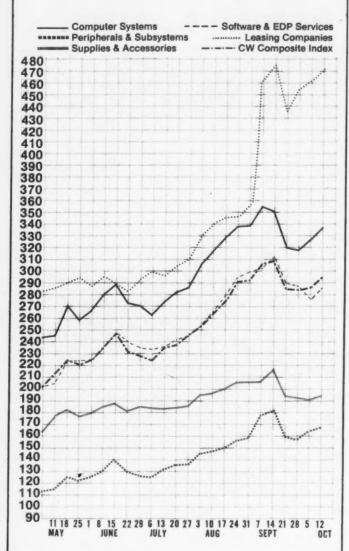
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	1978	1977
Shr Ernd	\$1.54	\$1.3
Revenue	217,837,000	164,188,00
Earnings	19,666,000	16,428,00
3 Mo Shr	.44	.3
Revenue	61,774,000	48,686,00
Farnings	5 674 000	4 656 00

#### MODULAR COMPUTER SYSTEMS

i i ii ee i	MONTHS ENGED TO	HIG	30
	1978		1977
Shr Ernd	\$.34		\$.16
Revenue	15,773,000		13,629,000
Disc Op Loss			145,000
Earnings	1,215,000		512,000
6 Mo Shr	.66		.28
Revenue	30,482,00		25,860,000
Disc Op Loss	****		170,000
Earnings	2,354,000		855,000
a-Restated			

#### TALLY Three Months Ended July 2

	1978	1977
Shr Ernd	\$.13	\$.2
Revenue	8,969,000	a7,803,00
Tax Cred		347,00
Earnings	366,000	808,00
6 Mo Shr	.30	.5
Revenue	17,253,000	a14,236,00
Tax Cred		529,000
Earnings	826,000	1,376,00
- 5		

#### TELENET Three Months Ended June 30

	1978	1977
Revenue	\$2,169,000	\$888,000
Loss	1,277,000	975,000
6 Mo Rev	3,648,000	1,581,000
Loss	2,384,000	1,935,000

#### TELEX Three Months Ended June 30

	13/0	10//
Shr Ernd	\$.20	\$.14
Revenue	31,683,000	22,028,000
Tax Cred	60,000	951,000
Earnings	2,201,000	1,555,000

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## TRADE QUOTES

## **Computerworld Stock Trading Summary**

CLOSING PRICES WEDNESDAY, OCTOBER 11, 1978

All statist	ics co	ompiled,
computed		formatted
TRADE C	DUOT	ES, INC.

1978 RANGE (1)  EER SYSTE (8-69) 89-87 33-44 21-74 22-71 44-75 19-54 22-13 11-19-46 88-40 7-26 88-40 7-26 88-40 7-26 88-40 7-26 88-40 7-26 88-50	CLOSE OCT 11 1978	CE	+9.9 +1.3 -11.1 +2.6 0.0 +7.1 +7.4 -4.8 -4.2 +1.6 -3.3 +21.4	042000200	ADVANCED COMP TECH ANACOMP INC APPLIED DATA RES. AUTOMATTC DATA PROC COLEMAN AMERICAN COS COMPUNICARY NETWORK COMPUTER HORIZONS COMPUTER MORIZONS COMPUTER STIENCES	1978 RANGE (1)  RE & EDP :  1- 2 8- 22 8- 17 24- 36 1- 2 7- 12 1- 9 8- 16	CLOSE OCT 11 1978 SERVICES 1 3/8 15 3/4 14 33 1 1/2 9 7 1/2	O - 1/4 - 1/8 + 1/4	0.0 -1.5 -0.8 +0.7	DATA ACCESS SYSTO DATA PRODUCTS CO DATUM INC	1978 RANGE (1) MS 3-14 9-20 P 15-25 2-6	CLOSE OCT 11 1978 11 1/2 19 1/4 20 1/2 4 3/4 4 5/8	CE WEEK NET CHNGE - 1/2 0 0 + 1/8 - 1/8	C
RANGE (1)  TER SYSTE  8- 69  9- 87  44  12- 71  14- 75  12- 71  14- 75  11- 19  9- 40  7- 26  1- 3  1- 13  7- 26  1- 3  1- 3  7- 26  1-	TEMS  56 3/4 77 1/4 39 1/4 63 3/8 69 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+5 1/8 +1 1/2 +1 0 +3 5/8 +4 5/8 +3 5/8 - 1/2 - 5/8 - 1/4 +3 3/4 +3 1/8	PCT CHNGE +9.9 +1.3 -11.1 +2.6 0.0 +7.1 +7.4 8 -4.8 -4.2 +1.6 -3.3	H COARCODORGO	ADVANCED COMP TECH ANACOMP INC APPLIED DATA RES. AUTOMATTC DATA PROC COLEMAN AMERICAN COS COMPUNICARY NETWORK COMPUTER HORIZONS COMPUTER MORIZONS COMPUTER STIENCES	RANGE (1) RE & EDP : 1- 2 8- 22 8- 17 24- 36 1- 2 7- 12 1- 9	OCT 11 1978 SERVICES 1 3/8 15 3/4 14 33 1 1/2	0 - 1/4 - 1/8 + 1/4	0.0 -1.5 -0.8 +0.7	O DATA ACCESS SYST O DATA 100 A DATA PRODUCTS COI O DATUM INC	RANGE (1)  MS 3- 14 9- 20 P 15- 25 2- 6 PUT 2- 6	11 1/2 19 1/4 20 1/2 4 3/4 4 5/8	NET CHNGE - 1/2 0 0 + 1/8	C
(1)  (8-69) (8-69) (8-7	1978  56 3/4 77 1/4 27 3/4 39 1/4 67 3/8 69 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 2 3/8 70 3/8 290 1/2	+5 1/8 +1 -3 1/2 +1 0 +3 5/8 +4 5/8 +3 5/8 -1 1/2 - 5/8 -1 1/4 +3 3/4 -1 1/4	+9.9 +1.3 -11.1 +2.6 -0.0 +6.0 +7.1 +7.4 -4.8 -4.2 +1.6	H COARCODORGO	ADVANCED COMP TECH ANACOMP INC APPLIED DATA RES. AUTOMATTC DATA PROC COLEMAN AMERICAN COS COMPUNICARY NETWORK COMPUTER HORIZONS COMPUTER MORIZONS COMPUTER STIENCES	1- 2 8- 22 8- 17 24- 36 1- 2 7- 12 1- 9	1978 SERVICES 1 3/8 15 3/4 14 33 1 1/2	0 - 1/4 - 1/8 + 1/4	0.0 -1.5 -0.8 +0.7	D DATA ACCESS SYSTO DATA 100 A DATA PRODUCTS COID DATUM INC	MS 3-14 9-20 P 15-25 2-6	1978 11 1/2 19 1/4 20 1/2 4 3/4 4 5/8	- 1/2 0 0 + 1/8	2 .
7ER SYSTE   88- 69   99- 87   13- 44   13- 44   12- 71   14- 75   14- 75   14- 75   15- 19   15- 19   15- 19   16- 305   17- 26	56 3/4 77 1/4 39 1/4 67 63 3/9 69 1/4 52 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/2	+5 1/8 +1 -3 1/2 +1 0 +3 5/8 +4 5/8 +3 5/8 -1 1/2 - 5/8 -1 1/4 +3 3/4 -1 1/8	+9.9 +1.3 -11.1 +2.6 0.0 +6.0 +7.1 -4.8 -4.2 +1.6 -3.3	COANCOCONCO	ADVANCED COMP TECH ANACOMP INC APPLIED DATA RES. AUTOMATTC DATA PROC COLEMAN AMERICAN COS COMPUNICARY NETWORK COMPUTER HORIZONS COMPUTER MORIZONS COMPUTER STIENCES	RE & EDP : 1- 2 8- 22 8- 17 24- 36 1- 2 7- 12 1- 9	1 3/8 15 3/4 14 33 1 1/2	0 - 1/4 - 1/8 + 1/4	0.0 -1.5 -0.8 +0.7	D DATA ACCESS SYST D DATA 100 A DATA PRODUCTS CO D DATUM INC	MS 3- 14 9- 20 P 15- 25 2- 6	11 1/2 19 1/4 20 1/2 4 3/4 4 5/8	- 1/2 0 0 + 1/8	2 .
8- 69 9- 87 3- 44 11- 74 12- 71 14- 75 9- 54 1- 19- 68 1- 19- 68 1- 19- 68 1- 33 1- 19- 9- 46 1- 33 1- 19- 9- 68 1- 33- 72 16- 305 29- 29 00- 23 5- 8	56 3/4 77 1/4 27 3/4 39 1/4 67 1/6 63 3/8 69 1/4 52 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+1 -3 1/2 +1 0 +3 5/8 +4 5/8 +3 5/8 -1/2 -5/8 + 5/8 -1 1/4 +3 3/4 -1/8	+1.3 -11.1 +2.6 0.0 +6.0 +7.1 +7.4 -4.8 -4.2 +1.6 -3.3	042000200	ADVANCED COMP TECH ANACOMP INC APPLIED DATA RES. AUTOMATTC DATA PROC COLEMAN AMERICAN COS COMPUNICARY NETWORK COMPUTER HORIZONS COMPUTER MORIZONS COMPUTER STIENCES	1- 2 8- 22 8- 17 24- 36 1- 2 7- 12 1- 9	1 3/8 15 3/4 14 33 1 1/2	- 1/4 - 1/8 + 1/4	-1.5 -0.8 +0.7	D DATA 100 A DATA PRODUCTS CO	9- 20 P 15- 25 2- 6	19 1/4 20 1/2 4 3/4 4 5/8	0 0 + 1/8	
8- 69 9- 87 3- 44 11- 74 12- 71 14- 75 9- 54 1- 19- 68 1- 19- 68 1- 19- 68 1- 33 1- 19- 9- 46 1- 33 1- 19- 9- 68 1- 33- 72 16- 305 29- 29 00- 23 5- 8	56 3/4 77 1/4 27 3/4 39 1/4 67 1/6 63 3/8 69 1/4 52 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+1 -3 1/2 +1 0 +3 5/8 +4 5/8 +3 5/8 -1/2 -5/8 + 5/8 -1 1/4 +3 3/4 -1/8	+1.3 -11.1 +2.6 0.0 +6.0 +7.1 +7.4 -4.8 -4.2 +1.6 -3.3	042000200	ADVANCED COMP TECH ANACOMP INC APPLIED DATA RES. AUTOMATTC DATA PROC COLEMAN AMERICAN COS COMPUNICARY NETWORK COMPUTER HORIZONS COMPUTER MORIZONS COMPUTER STIENCES	1- 2 8- 22 8- 17 24- 36 1- 2 7- 12 1- 9	1 3/8 15 3/4 14 33 1 1/2	- 1/4 - 1/8 + 1/4	-1.5 -0.8 +0.7	D DATA 100 A DATA PRODUCTS CO	9- 20 P 15- 25 2- 6	19 1/4 20 1/2 4 3/4 4 5/8	0 0 + 1/8	
19-87 3-44 13-44 11-74 12-75 19-54 22-75 11-19 9-46 18-40 7-26 1-3 13-72 26-305 29-29 0-23 5-8	77 1/4 27 3/4 39 1/4 67 63 3/8 69 1/4 52 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+1 -3 1/2 +1 0 +3 5/8 +4 5/8 +3 5/8 -1/2 -5/8 + 5/8 -1 1/4 +3 3/4 -1/8	+1.3 -11.1 +2.6 0.0 +6.0 +7.1 +7.4 -4.8 -4.2 +1.6 -3.3	042000200	ANACOMP INC APPLIED DATA RES. AUTOMATTC DATA PROC COLEMAN AMERICAN COS COMPUNSERV NETWORK COMPUTER HORIZONS COMPUTER HORIZONS COMPUTER SCIENCES	8- 22 8- 17 24- 36 1- 2 7- 12 1- 9	15 3/4 14 33 1 1/2	- 1/4 - 1/8 + 1/4	-1.5 -0.8 +0.7	D DATA 100 A DATA PRODUCTS CO	9- 20 P 15- 25 2- 6	19 1/4 20 1/2 4 3/4 4 5/8	0 0 + 1/8	
23- 44 11- 74 11- 74 12- 71 14- 75 19- 54 2- 13 11- 19 19- 46 18- 40 7- 26 1- 3 12- 93 13- 72 16- 305 9- 29 9- 29 0- 23 5- 8	27 3/4 39 1/4 67 63 3/8 69 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	-3 1/2 +1 0 +3 5/8 +4 5/8 +3 5/8 -1 1/2 - 5/8 + 5/8 -1 1/4 +3 3/4 - 1/8	-11.1 +2.6 0.0 +6.0 +7.1 +7.4 -4.8 -4.2 +1.6 -3.3	420000200	APPLIED DATA RES. AUTOMATIC DATA PROC COLEMAN AMERICAN COS COMPU-SERV NETWORK COMPUTER HORIZONS COMPUTER NETWORK COMPUTER SCIENCES	8- 17 24- 36 1- 2 7- 12 1- 9	14 33 1 1/2	- 1/8 + 1/4	-0.8 +0.7	A DATA PRODUCTS CO	P 15- 25 2- 6 IPUT 2- 6	20 1/2 4 3/4 4 5/8	+ 1/8	i ,
3- 44 11- 74 12- 71 14- 75 19- 54 2- 13 11- 19 9- 46 18- 40 7- 26 1- 3 12- 3 13- 72 16-305 9- 29 0- 23 5- 8	39 1/4 67 63 3/8 69 1/4 52 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+1 0 +3 5/8 +4 5/8 +3 5/8 - 1/2 - 5/8 + 5/8 -1 1/4 +3 3/4 - 1/8	+2.6 0.0 +6.0 +7.1 +7.4 -4.8 -4.2 +1.6 -3.3	20000200	AUTOMATIC DATA PROC COLEMAN AMERICAN COS COMPU-SERV NETWORK COMPUTER HORIZONS COMPUTER NETWORK COMPUTER SCIENCES	24- 36 1- 2 7- 12 1- 9	33 1 1/2 9	+ 1/4	+0.7	D DATUM INC	2- 6 IPUT 2- 6	4 3/4 4 5/8	+ 1/8	1
11- 74 12- 71 14- 75 19- 54 2- 13 11- 19 9- 46 18- 40 7- 26 1- 3 12- 93 13- 72 16-305 29- 00- 23 5- 8	67 3/8 69 1/4 52 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	0 +3 5/8 +4 5/8 +3 5/8 - 1/2 - 5/8 + 5/8 -1 1/4 +3 3/4 - 1/8	0.0 +6.0 +7.1 +7.4 -4.8 -4.2 +1.6 -3.3	00000	COLEMAN AMERICAN COS COMPU-SERV NETWORK COMPUTER HORIZONS COMPUTER NETWORK COMPUTER SCIENCES	1- 2 7- 12 1- 9	1 1/2				PUT 2- 6	4 5/8		
22- 71 14- 75 19- 54 2- 13 1- 19 9- 46 8- 40 7- 26 1- 3 3- 72 16-305 29- 29 0- 23 5- 8	63 3/8 69 1/4 52 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+3 5/8 +4 5/8 +3 5/8 - 1/2 - 5/8 + 5/8 -1 1/4 +3 3/4 - 1/8	+6.0 +7.1 +7.4 -4.8 -4.2 +1.6	00000	COMPU-SERV NETWORK COMPUTER HORIZONS COMPUTER NETWORK COMPUTER SCIENCES	7- 12 1- 9	9	0						3 .
14- 75 19- 54 2- 13 11- 19 19- 46 18- 40 7- 26 11- 3 12- 93 13- 72 16-305 29- 29 10- 23 5- 8	69 1/4 52 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+4 5/8 +3 5/8 - 1/2 - 5/8 + 5/8 -1 1/4 +3 3/4 - 1/8	+7.1 +7.4 -4.8 -4.2 +1.6 -3.3	0 0 0	COMPUTER HORIZONS COMPUTER NETWORK COMPUTER SCIENCES	1- 9	195	. 1/2		O DELTA DATA SYSTE			- 1/8	
9- 54 2- 13 1- 19 9- 46 8- 40 7- 26 1- 3 2- 93 3- 72 6-305 9- 29 0- 23 5- 8	52 1/4 9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+3 5/8 - 1/2 - 5/8 + 5/8 -1 1/4 +3 3/4 - 1/8	+7.4 -4.8 -4.2 +1.6 -3.3	0 0 0	COMPUTER NETWORK COMPUTER SCIENCES			+ 1/2	+5.8	A DOCUMATION INC	6- 34	30	+2	
2- 13 1- 19 9- 46 8- 40 7- 26 1- 3 12- 93 13- 72 16-305 9- 29 0- 23 5- 8	9 3/4 14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	- 1/2 - 5/8 + 5/8 -1 1/4 +3 3/4 - 1/8	-4.8 -4.2 +1.6 -3.3	0 0	COMPUTER SCIENCES	9- 10	12 1/4	+ 1/2	+4.2	O DATARAM CORP	6- 32	31 3/4	+3 1/2	
1- 19 9- 46 8- 40 7- 26 1- 3 32- 93 33- 72 16-305 9- 29 00- 23 5- 8	14 38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	- 5/8 + 5/8 -1 1/4 +3 3/4 - 1/8	-4.2 +1.6 -3.3	0		8- 17	15 1/4	+1 3/8	+9.9	N ELECTRONIC M & M	4- 9	7 1/2	+ 3/8	
9- 46 8- 40 7- 26 1- 3 2- 93 3- 72 6-305 9- 29 0- 23 5- 8	38 5/8 36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+ 5/8 -1 1/4 +3 3/4 - 1/8	+1.6	0	COMPUTER TASK GROUP	1- 4	3 3/4	+ 1/2	+15.3	O FABRI-TEK	1- 2	1 3/8	+ 1/8	
8- 40 7- 26 1- 3 2- 93 3- 72 6-305 9- 29 0- 23 5- 8	36 21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	-1 1/4 +3 3/4 - 1/8	-3.3		COMPUTER USAGE	2- 4	3 5/8	- 1/8	-3.3	O GENERAL COMPUTER		2 3/8	+ 1/8	
7- 26 1- 3 2- 93 3- 72 6-305 2- 29 0- 23 5- 8	21 1/4 2 3/8 88 3/4 70 3/8 290 1/2	+3 3/4		0	COMSHARE	6- 19	18	+1 3/4	+10.7	N HAZELTINE CORP	10- 17	15 5/8	-1 1/8	1
1- 3 2- 93 3- 72 6-305 2 9- 29 0- 23 5- 8	2 3/8 88 3/4 70 3/8 290 1/2	- 1/8			DATA DIMENSIONS INC	4- 9	7 5/8	+ 1/4	+3.3	N HARRIS CORP	17- 36	35 3/4	+ 5/8	3
2- 93 3- 72 6-305 9- 29 0- 23 5- 8	88 3/4 70 3/8 290 1/2		-5.0		DATATAB	1- 2	1 1/4	- 1/4	-16.6	O INFOREX INC	6- 11	9 3/8	- 1/2	
6-305 2 9- 29 0- 23 5- 8	290 1/2		+1.2		ELECTRONIC DATA SYS.	15- 25	22 3/8	+1	+4.6	D INFORMATION INTL	INC 8- 12	9 1/2	+ 1/4	
6-305 2 9- 29 0- 23 5- 8	290 1/2	+4 1/2	+6.8	0	INSYTE CORP	1- 3	1 3/4	+ 1/8	+7.6	O INTEL CORP	39- 62	56 1/2	*1 1/2	
9- 29 0- 23 5- 8	23 1/2	+8 1/2	+3.0	0	IPS COMPUTER MARKET.	2- 3	3 1/4	+ 1/4	+8.3	A LUNDY ELECTRONIC	4- 8	7	- 1/2	
5 8		+ 1/4	+1.0	0	KEANE ASSOCIATES	3- 6	5-1/4	- 1/8	-2.3	O MST DATA CORP	12- 19	14 3/8	+ 5/8	
	20 1/2	+2 5/8	+14.6	0	KEYDATA CORP	1- 3	2 1/4	+ 1/8	+5.8	N MEMOREX	27- 59	51	*2 1/4	1
7- 17	7 1/4	- 1/4	-3.3	4	LOGICON	11- 19	15 1/2	+ 1/4	+1.6	N MOHAWK DATA SCI	6- 15	12 5/8	+1 1/2	
	13 3/4	-1	-6.7		MANAGEMENT DATA	1- 1	1/8	0	0.0	O DMEX	2- 6	6	+ 1/2	
	67 3/8	+5 7/8	+9.5		NATIONAL CSS INC	15- 36	29	- 3/8	-1.2	O PENRIL CORP	5- 12	12 3/4	+1	
	37 1/4	+1 1/8	+3.1	C	NATIONAL DATA CORP	7- 13	11 1/4	+ 3/8	+3.4	N PERTEC CORP	9- 17	15 3/4	+ 5/8	
	28	+1	+3.7	A	ON LINE SYSTEMS INC	17- 30	25 5/8	- 3/8	-1.4	A POTTER INSTRUMENT	2- 2	1 3/4	0	
	51 1/2	+3 3/4	+7.8	N	PLANNING RESEARCH	4- 10	9	+ 1/8	+1.4	O QUANTOR CORP	2- 5	2 1/2	0	
	46 1/8	+2 1/2	+5.7		PROGRAMMING & SYS	1- 1	1 1/2	0	0.0	O RECOGNITION EQUIP	7- 13	11 1/4	+ 5/8	
	17 1/2	+ 1/2	+2.9		RAPIDATA INC	3- 7	6	0	0.0	O SCAN DATA	1- 5	2 7/8	+ 1/8	
	27 1/2	+ 3/4	+2.8	0	REYNOLDS & REYNOLD	18- 36	29 1/2	+ 1/2	+1.7	N STORAGE TECHNOLOG		33 1/4	+ 1/2	
				0	SCIENTIFIC COMPUTERS	3- 9	9	+1	+12.5	O T BAR INC	11- 20	19 3/4	+2	4
			1	0	TYMSHARE INC	18- 33	29	+1 1/0	+4.0	O TALLY CORP.	4- 9	7 5/8	+ 1/8	
				Δ	URS SYSTEMS	5- 8	7 5/8	+ 3/8	+5.1	A TEC INC	6- 13	10 5/8	+ 1/8	
				N	WYLY CORP	1- 7	6 1/4	+ 1/8	+2.0	N TEKTRONIX INC	33- 50	47 7/8	+ 5/8	
COMPANI	IES									N TELEX	3- 9	7 7/8	+ 3/8	
										O TESDATA SYSTEMS C		14 1/2	-1	
3- 21	21	+ 1/2	+2.4		DEDIDUE	RALS & SUB	CVCTEME			O WILTER INC	1- 1	1 5/8	+ 1/4	-
5- 21	20 3/4	+1.1/2	+7.7		PERIFFE	ME 3 6 300	3131543							
1- 1	5/8	0	0.0	N	ADDRESSOGRAPH-MULT	14- 32	28 3/6	+ 1/8	+0.4					
1- 7	4 7/8	+ 1/8	+2.6											
	2 1/2	0	0.0			10- 19	16 3/4	- 1/4		SU	PLIES & ACCE	SORIES		
						5- 10	7 1/4	- 1/4	-3.3					
						13- 22	14 1/8	- 3/4	-5.0	A AMERICAN BUS PROD	6- 11	9 1/4	- 1/8	
						4- 7	6 3/8	+ 1/2	+8.5	O BALTIMORE BUS FOR	IS 2- 5	1 3/4	- 1/4	-
						6- 14	12 1/2	- 5/8	-4.7	A BARRY WRIGHT	14- 30	28	- 1/2	
					BUNKER-RAMO	10- 20	18 5/8	0	0.0	O CYBERMATICS INC	1- 1	1	0	
				8	CALCOMP	3- 13	10 7/8	- 1/8	-1.1		IC 18- 30			
3- 20	17 3/4	- 1/8	-0.6	0	CAMBRIDGE MEMORIES	3- 9	6 5/8	+ 3/8	+6.0		8- 17			
				N	CENTRONICS DATA COMP	16- 37	34	-2 1/4	-6.2	N 3M COMPANY	43- 66			
			- 1	0	COGNITRONICS	1- 4	2 1/4	+ 1/4	+12.5					
					COMPUTER COMMUN.	6- 12	9 5/8	- 5/8	-6.0					
			- 1			4- 10								1
					COMPUTER EQUIPMENT	3- 6	5 3/4	+ 1/2						
		_					3 3/8							4
	II -BALT-U	ACM												-
4. 0-04**	IL-DALI-W	NTED		N	CONRAC CORP	19- 26	22	+ 1/2	+2.3	N WALLACE BUS FORMS	18- 33	21 3/8	- 3/8	-
V: P=PHI			,											
: O=OVER-		FW21 010												
1-3-8-6-4-1-4-	3 5 14 36 36 4 7 20	3 2 1/2 5 4 1/8 14 13 3/8 36 33 1/2 36 31 3/4 4 2 1/2 7 4 7/8 20 17 3/4	3 2 1/2 0 5 4 1/8 + 1/8 14 13 3/8 + 3/4 36 33 1/2 +1 36 31 3/4 - 1/4 4 2 1/2 0 7 4 7/8 + 1/8 20 17 3/4 - 1/8	3 2 1/2 0 0.0 5 4 1/8 + 1/8 + 3.1 14 13 3/8 + 3/4 + 5.9 36 33 1/2 +1 +3.0 36 31 3/4 - 1/4 -0.7 4 2 1/2 0 0.0 7 4 7/8 + 1/8 +2.6 20 17 3/4 - 1/8 -0.6	3 2 1/2 0 0.0 N 5 4 1/8 + 1/8 +3.1 14 13 3/8 + 3/4 +5.9 N 36 33 1/2 +1 +3.0 C 36 31 3/4 - 1/4 -0.7 A 4 2 1/2 0 0.0 N 7 4 7/8 + 1/8 +2.6 S 20 17 3/4 - 1/8 -0.6 N 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 2 1/2 0 0.0 NAMPEX CORP 5 4 1/8 + 1/8 + 3/4 + 5.9 16 13 3/8 + 3/4 + 5.9 36 33 1/2 + 1 + 3.0 NAMPEX CORP 36 31 3/4 - 1/4 - 0.7 4 7/8 + 1/8 + 2.6 20 17 3/4 - 1/8 - 0.6 20 17 3/4 - 1/8 - 0.6 20 17 3/4 - 1/8 - 0.6 20 17 3/4 - 1/8 - 0.6 20 17 3/4 - 1/8 - 0.6 20 17 3/4 - 1/8 - 0.6 20 17 3/4 - 1/8 - 0.6 20 17 3/4 - 1/8 - 0.6 21 17 3/4 - 1/8 - 0.6 22 17 3/4 - 1/8 - 0.6 23 17 3/4 - 1/8 - 0.6 24 17 3/4 - 1/8 - 0.6 25 17 3/4 - 1/8 - 0.6 26 17 3/4 - 1/8 - 0.6 27 17 3/4 - 1/8 - 0.6 28 18 19 19 19 19 19 19 19 19 19 19 19 19 19	3 2 1/2 0 0.0 1 10 19 10 19 10 19 11 10 19 11 11 11 11 11 11 11 11 11 11 11 11	3 2 1/2 0 0.0 5 4 1/8 + 1/8 + 3/1 14 13 3/8 + 3/4 + 5.9 36 33 1/2 + 1 + 3.0 36 31 3/4 - 1/4 - 0.7 4 2 1/2 0 0.0 7 4 7/8 + 1/8 + 1/8 + 0.6 20 17 3/4 - 1/8 - 0.6	3 2 1/2 0 0.0 1 APPEX CORP 10-19 16 3/4 - 1/4 1/4 1/8 4/18 4/18 4/18 4/18 4/18 4/	3 2 1/2 0 0.0 1 AMPEX CORP 10-19 16 3/4 - 1/4 -1.4 14 13 3/8 + 3/4 +5.9 3/6 33 1/2 +1 4.0 -0.7 4.7 6 +1/8 +0.6 20 17 3/4 - 1/8 -1.1 2.5 20 20 20 20 20 20 20 20 20 20 20 20 20	3 2 1/2 0 0.0 1 AMPEX CORP 10-19 16 3/4 - 1/4 -1.4 1.4 1.4 1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8	3 2 1/2 0 0.0 1 5 4 1/8 + 1/8 + 3/1 + 5.9 14 13 3/8 + 3/4 + 5.9 36 33 1/2 + 1 + 3.0 36 31 3/4 - 1/4 -	3 2 1/2 0 0.0 1 5 4 1/8 + 1/8 + 314 + 518 14 13 3/8 + 3/4 + 5.9 3/6 33 1/2 + 1 + 3.0 7 36 31 3/4 - 1/4 - 1/4 - 3.3 3/8 + 1/4 + 1/8 + 1/8 - 1/4 -	3 2 1/2 0 0.0 1 5 4 1/8 + 1/8 + 3/1   14 13 3/8 + 3/4   5.9 36 33 1/2 + 1   4.0 0.0 7   4.7 1/8 + 1/8   7.4 7/8 + 1/8 + 1/8   7.4 7/8 + 1/8 + 1/8   7.5 1/8 1/8 + 1/8   7.5 1/8 1/8 + 1/8   7.5 1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8

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